2025-2026 Next Level Programs of Study

Review Document

Revision Date: June 17, 2025

The purpose of the NLPS Review Document is to provide instructors, administrators, and other stakeholders with the opportunity to view the 4-course sequence for each Next Level Program of Study (NLPS) in its entirety and find relevant information about all NLPS courses. Individuals can find course descriptions, the postsecondary courses at Ivy Tech and Vincennes that each NLPS course is aligned to, the key competencies for each secondary CTE course, and other additional information.

Please Note:

- **Postsecondary courses followed by an * are not available for dual credit**
- **Vincennes University postsecondary courses followed by a ▼ are not available for dual credit for secondary freshmen students**
- Vincennes University postsecondary courses followed by a ^ are only available for dual credit through an approved VU Early College program

CTE funding information, assignment codes, dual credit availability and certification alignment are included where possible. It may still be necessary to use some of the additional resources provided by the CTE team, but the Review Document consolidates much of the pertinent course information into one resource.

Notable updates for 2025-2026 school year:

- CTE Programs of Study have been realigned to reflect the national Career Cluster updates
- **Because all CTE courses count as electives (personalized or directed) across all diploma types, this will no longer be noted on each individual course.**
    - Courses that meet science, STEM, or other graduation requirements for the Core 40 or new Indiana Diploma are still noted with each course's information
- **The Human and Social Services pathway will be phased out with the 2026 – 2027 school year.** Schools are encouraged to explore adoption of the Social and Community Services program of study which now has dual credit and postsecondary credential alignment through Ivy Tech. Assignment codes have also been updated for the Social and Community Services pathway
- An Informatics Program of Study has been added to the Digital Technology (formerly Information Technology) career cluster
- For program of study Capstone courses, priority standards are denoted with tan shading. These are the standards that must be covered in the first two credits of a program of study Capstone course.
- Course standards have been updated for Construction Trades: Masonry Capstone (7391), Heavy Equipment Capstone (7292), and Advanced Manufacturing Technology (7103)
- Introduction to Cosmetology (7175) has been removed per the updates in the 2025-2026 Course Titles and Descriptions.
- Course additions per the 25-26 CTE Course Titles and Descriptions include Computing Foundations for a Digital Age (4565); Social and Community Services Capstone (7279); Youth Apprenticeship (6149); Data Analytics and Informatics Operations (7484); and Informatics Capstone (7485)
- Principles of Industry 4.0 – Smart Manufacturing (7220) added as an alternative course option in Principles sections and Robotics Design and Innovation (4728) added as an alternative course option for Concentrator A sections in Industrial Automation and Robotics, Industrial Maintenance Electrical, and Industrial Maintenance Mechanical program sequences. *Students must use these two courses together when adopting them for the listed pathways.*

- The Supply Chain Management program of study has been renamed Supply Chain and Logistics and has been shifted to the Supply Chain and Transportation career cluster (formerly in the Business Management career cluster)
- Business Management Capstone (7201) has been renamed Small Business Operations Capstone
- Small Business Operations (7147) has been renamed Entrepreneurial Operations
- Entrepreneurial Operations (7147) and New Venture Development (7148) have switched in sequence per Ivy Tech recommendations. However, courses can be taken interchangeably.
- Beginning in the 2026-27 school year, Community Health Worker (Course 7278, currently Concentrator B in Social and Community Services sequence) will be renamed Advanced Social and Community Services.

Next Level Programs of Study (NLPS) Overview

Indiana fully implemented ***Next Level Programs of Study (NLPS)*** in the 2024-2025 school year following a collaborative effort of key stakeholders to redesign secondary CTE**.** The NLPS course structure serves as the key framework for schools and career centers to deliver the benefits available through secondary CTE programs.

The Concentrator sequences consist of three courses for every program of study: Principles, Concentrator A, and Concentrator B. Programs of study begin with a foundational course and gradually increase the depth of content and occupational specificity. Each program of study also includes a Capstone course designed to let students complete postsecondary credentials and participate in embedded work-based learning.

CTE programs of study can be offered in a variety of settings, including comprehensive high schools or a career center. Students can take up to 6 credits in a pathway each year, **made possible by allowing any required prerequisites to be implemented as corequisites.** Other benefits of the NLPS course structure include the following:

- Ability to earn CTE Concentrator Status in one year if participating in a multi-period training program that allows the student to complete the Principles, Concentrator A, and Concentrator B courses.
- All programs of study follow the same 4-course structure. This creates greater consistency and expectations across all CTE pathways.
- Most advanced courses (Concentrator A and Concentrator B courses) are each aligned to 6 college credit hours that have been intentionally aligned to postsecondary credentials.
- The Capstone course includes time for embedded work-based learning experiences.

These elements and others allow students to meet many of the requirements of Indiana's new high school diploma and Readiness Seals through participating in a Next Level Program of Study.

Other NLPS Resources:

To learn more about CTE Programs of Study and to use additional resources, please visit the CTE section of the Indiana Commission for Higher Education website. All programming resources can primarily be found here, including the **Master Pathways List** that allows individuals to quickly identify the available programs of study and the course options within each pathway.

2025-2026 Next Level Programs of Study

Review Document

Advanced Manufacturing
Biotechnology
Design Technology
Electronics and Computer Technology
Engineering
Industry 4.0 – Smart Manufacturing
Industrial Automation and Robotics
Industrial Technical Maintenance - Electrical
Industrial Technical Maintenance – Mechanical
Precision Machining
Welding Technology
Agriculture
Ag Mechanical and Engineering
Agri-Science - Plants or Animals - (combined Animal, Plant, and Food Products)
Horticulture
Landscaping
Precision Agriculture
Veterinary Science
Water Systems
Arts, Entertainment, & Design
Digital Design
Fashion and Textiles
Interior Design
Radio and Television
Business Management
Business Administration
Business Operations and Technology
Construction
Building and Facilities Maintenance
Civil Construction
Construction Trades – Carpentry
Construction Trades – Electrical
Heating, Ventilating and Air Conditioning Technology (HVAC)
Heavy Equipment Operator
Plumbing and Pipefitting
CTE and WBL Courses
CTE Foundational Courses
CTE Nonstandard Courses: CTE Pilot, Locally Created CTE Concentrator, CTSO Leadership
Work-Based Learning
Digital Technology

Computer Science
Cybersecurity (VU)
Cybersecurity and Information Assurance (ITCC)
Informatics (***NEW***)
Information Technology Operations
Networking
Software Development
Education
Early Childhood
Education Professions
Energy & Natural Resources
Energy Technology
Natural Resources
Financial Services
Accounting
Finance and Investment
Insurance
Health & Human Services
Biomedical Sciences and Technology
Central Service Tech / Surgical Technician
Certified Clinical Medical Assistant (CCMA)
Cosmetology and Barbering
Dental Careers
Emergency Medical Services
Exercise Science
Human and Social Services
Pharmacy
Pre-Nursing / Healthcare Specialist (Includes CNA)
Social and Community Services
Hospitality, Events, & Tourism
Culinary Arts
Hospitality Management
Nutrition Science
Marketing, Sales, & Entrepreneurship
Entrepreneurship
Marketing and Sales
Public Service & Safety
Criminal Justice
Fire and Rescue
Paralegal

Supply Chain & Transportation
Automotive Collision Repair
Automotive Services
Aviation Maintenance
Aviation Management
Commercial Driver
Diesel Services
Supply Chain and Logistics

Advanced Manufacturing

Introduction to Advanced Manufacturing and Logistics		
Career Cluster	Advanced Manufacturing	
Program of Study		
NLPS Sequence	Introductory	
Course Code	4796	
Course Description	Introduction to Advanced Manufacturing and Logistics introduces students to the field of advanced manufacturing and logistics. The course explores the field's relationship to society, individuals, and the environment. Students learn to apply modern manufacturing processes in order to obtain resources and change them into industrial materials, industrial products, and consumer products. Students investigate the properties of engineered materials. Students study six major types of material processes: casting and molding, forming, separating, conditioning, finishing, and assembling. After gaining a working knowledge of these processes, students are introduced to the logistical and business principles utilized in today's advanced manufacturing industry. Students gain a basic understanding of tooling, electrical skills, operation skills, inventory principles, Material Safety Data Sheets (MSDS), chart and graph reading, and other Manufacturing Skill Standards Council (MSSC) concepts. There is also an emphasis placed on the flow process principles, material movement, safety, and related business operations. Students have the opportunity to develop the characteristics employers seek as well as skills that will help them in future endeavors.	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes	**Note**: This course qualifies for funding at the 8th grade level. When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma	
ADDITIONAL COURSE INFO		
Funding	Introductory	Available for 8th grade
Bulletin 400	● Industrial Arts 7-12, K12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education 5-12	

	● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
4796.D8.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
4796.D8.2	Explain the benefits and responsibilities of being a member of a CTSO.
4796.D8.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
4796.D8.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
4796.D9.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
4796.D9.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster.
4796.D9.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
4796.D9.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society.
4796.D9.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest.
4796.D9.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
4796.D9.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster.
Domain	***Manufacturing***
4796.D1.1	Students evaluate principles of manufacturing to assess their role in manufacturing operations and processes in logistics.
4796.D1.2	Identify the basics of product design

4796.D1.3	Explain the concepts of engineering and its importance within manufacturing
4796.D1.4	Differentiate between the various types of materials and their applications
4796.D1.5	Develop an understanding of product processing and the equipment associated with it
4796.D1.6	Explain the significance of quality control within product manufacturing
4796.D1.7	Examine the steps and process of product assembly
4796.D1.8	Explore the range of technologies available within manufacturing as a whole
4796.D1.9	Summarize how materials can be processed using tools and machines
Domain	***Materials Handling***
4796.D2.1	Students examine material handling in warehouses and distribution centers for a clear understanding of moving a product.
4796.D2.2	Discuss material handling, storage, and shipping methods
4796.D2.3	Analyze visual design and appearance requirements for packages
4796.D2.4	Explain size, weight, and shape requirements for packaging
4796.D2.5	Identify material handling and storage equipment
4796.D2.6	Discuss layout plans for processing packages
4796.D2.7	Identify types of warehouses and distribution centers
Domain	***Introduction to Logistics***
4796.D3.1	Students evaluate the history and fundamentals of logistics to understand its relation to manufacturing.
4796.D3.2	Describe the history and relevance of logistics
4796.D3.3	Examine logistic systems used for the transportation of products and services
4796.D3.4	Define terms associated with the logistics, planning, and management industries
4796.D3.5	Recognize the need for material control planning
4796.D3.6	Explore the various options and methods available for shipping/transportation
4796.D3.7	Explore value added services to improve quality and efficiency
4796.D3.8	Recognize the importance of safety, products, and people
Domain	***Basic Business Principles***
4796.D4.1	Students analyze business principles to make and support manufacturing and logistics decisions.
4796.D4.2	Develop a strong understanding of profits and losses
4796.D4.3	Explore the practice of marketing and explain its relevance
4796.D4.4	Illustrate the various needs for finance
4796.D4.5	Discover accounting practices and explain why they are needed
4796.D4.6	Explain why there is a need for operations in logistics
4796.D4.7	Discuss and understand business structure within advanced manufacturing and logistics
Domain	***Advanced Manufacturing***
4796.D5.1	Students evaluate advanced manufacturing procedures to improve processes.
4796.D5.2	Develop an awareness of process flow principles
4796.D5.3	Acquire an understanding of systems
4796.D5.4	Compile basic machine operations skills
4796.D5.5	Practice essential mechanical skills
4796.D5.6	Build an understanding of tooling
4796.D5.7	Explore machining within manufacturing industry
4796.D5.8	Develop a strong understanding of different assembly processes
4796.D5.9	Differentiate between materials

4796.D5.10	Acquire basic electrical knowledge and skills
4796.D5.11	Establish fundamental pneumatic skills
4796.D5.12	Exercise basic skills within hydraulics
4796.D5.13	Demonstrate industrial maintenance skills for use in manufacturing
Domain	***Using Logistics***
4796.D6.1	Students apply and adapt skills within the field of logistics to improve operations.
4796.D6.2	Explore both macro and global levels of material movement
4796.D6.3	Explains the logistics, planning, and management industries at local, state, national, and international levels
4796.D6.4	Explain the importance of production planning and workflow within logistics
4796.D6.5	Recognize the need for production control
4796.D6.6	Develop an understanding of the principles of inventory
4796.D6.7	Explore continuous improvement to increase product quality
4796.D6.8	Understand MSDS's and explain why they are important within industry
4796.D6.9	Acquire basic skills of chart and graph reading
4796.D6.10	Develop a general understanding of shipping, receiving, and processes
4796.D6.11	Establish a global understanding of markets
Domain	***Welding Foundations***
4796.D11.1	Identify and evaluate the function and application of the tools, equipment, technology, and materials used in welding.
4796.D11.2	Understand welding codes such as American Petroleum Institute (API) and American Welding Society (AWS)
4796.D11.3	Apply knowledge and skills to health and safety in the workplace as specified by appropriate governmental regulations.
4796.D11.4	Choose appropriate personal protective equipment and evaluate skills related to health and safety in the workplace to employ welding equipment according to safety standards.
4796.D11.5	Identify and properly dispose of environmentally hazardous materials used for welding and explain the importance of recycling materials used in welding.
4796.D11.6	Demonstrate knowledge of welding sketches and identify types of welds such as fillet, groove, spot, plug, and flanged.
4796.D11.7	Demonstrate knowledge of welding currents and proper set-up procedure for shielded metal arc welding.
4796.D11.8	Apply shielded metal arc welding principles to perform fillet and groove welds in all positions and prepare joints for welding.
Domain	***Safety***
4796.D7.1	Students incorporate workplace and tool safety to maintain a safe work environment.
4796.D7.2	Identify hazards and apply safety methods for working in manufacturing jobs
4796.D7.3	Identify rules and laws designed to promote safety and health in the transportation, distribution, and logistics environments
4796.D7.4	Demonstrate proper use of safety equipment

Advanced Manufacturing: Special Topics	
Career Cluster	Advanced Manufacturing
Program of Study	
NLPS Sequence	
Course Code	4880
Course Description	*Advanced Manufacturing: Special Topics is an extended learning experience designed to address the advancement and specialization of careers within the career cluster through the provision of a specialized course for a specific workforce need in the school's region. The learning experience is at a qualified site, and is designed to give the student the opportunity to learn and practice technical skills; while working under the direction of the appropriately licensed professional. Throughout the course, students will focus on learning about employment opportunities and obtaining the knowledge, skills and attitudes essential for success in specific occupations. Course standards and curriculum must be tailored to the specific profession, preparing students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. Participation in a related CTSO encourages the development of leadership, communication and career related skills, and opportunities for community service.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, may be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Industrial Arts K-12
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Manufacturing 9-12
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● Workplace Specialist: Engineering or Manufacturing ● Technology Education with high school setting
REPA/REPA 3	●CTE: Trade & Industrial Engineering or Manufacturing 5-12 ●Workplace Specialist: Advanced Manufacturing 9-12 ●Technology Education 5-12

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Advanced Career & Technical Education, College Credit: Advanced Manufacturing	
Career Cluster	Advanced Manufacturing
Program of Study	
NLPS Sequence	
Course Code	6146
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited post-secondary institution through an adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint program of study involving a postsecondary partnership.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, may be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	

Funding	Pilot	
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Industrial Arts K-12	
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Manufacturing 9-12	
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● Workplace Specialist: Engineering or Manufacturing ● Technology Education with high school setting	
REPA/REPA 3	● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
	Competencies dependent on enrolled postsecondary coursework.	

Engineering and Technology: Special Topics	
Career Cluster	Advanced Manufacturing
Program of Study	
NLPS Sequence	
Course Code	4788
Course Description	*Engineering and Technology: Special Topics is an extended learning experience designed to address the advancement and specialization of careers within the career cluster through the*

	provision of a specialized course for a specific workforce need in the school's region. The learning experience is at a qualified site, and is designed to give the student the opportunity to learn and practice technical skills; while working under the direction of the appropriately licensed professional. Throughout the course, students will focus on learning about employment opportunities and obtaining the knowledge, skills and attitudes essential for success in specific occupations. Course standards and curriculum must be tailored to the specific profession, preparing students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. Participation in a related CTSO encourages the development of leadership, communication and career related skills, and opportunities for community service.
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Industrial Arts 7-12, K-12 ● Appropriate Vocational license
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway ● Appropriate Vocational License
Rules 2002	● Technology Education with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE License
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	

Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Introduction to Design Processes		
Career Cluster	Advanced Manufacturing	
Program of Study		
NLPS Sequence		
Course Code	4794	
Course Description	*Introduction to Design Processes is a course that specializes in modern design and engineering processes with a focus on creative problem solving in developing, testing, communicating, and presenting post-evaluation of products. Students use the design process to analyze research, develop ideas, and produce products and solutions. This process gives a framework through which they design, manufacture, test, and present their ideas. Students will demonstrate and utilize design principles and elements for visual presentation. Designing aspects will also cover aesthetics, ergonomics, the environment, safety, and production. The design process is a core-learning tool for many courses enabling the student to solve problems in a systematic, logical and creative manner. Students develop a good understanding of the way the process helps them think creatively and develop aesthetic ideas. The design process encourages the students to engage in higher level thinking to create solutions for many types of problems.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Introductory	
Bulletin 400	● Industrial Arts 7-12, K12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II, or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education with high school setting	

	● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
4794.D10.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
4794.D10.2	Explain the benefits and responsibilities of being a member of a CTSO.
4794.D10.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
4794.D10.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
4794.D11.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
4794.D11.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster
4794.D11.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
4794.D11.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society
4794.D11.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest
4794.D11.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
4794.D11.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career

	cluster
Domain	***The Design Process***
4794.D1.1	Students create solutions using the design process steps for solving problems.
4794.D1.2	Identify and describe the steps in the design process
4794.D1.3	Compare the design processes specific to the subject matter
4794.D1.4	Apply and adapt the design loop as a guide in problem solving
4794.D1.5	Discuss the importance of the design process and how the process affects the outcome
4794.D1.6	Discuss the impact technology and innovation has had on our world
Domain	***Problems and Opportunities***
4794.D2.1	Students examine problems to identify opportunities for innovative solutions.
4794.D2.2	Identify needs of human beings
4794.D2.3	Explain how problems can create opportunities
4794.D2.4	Describe and apply the faultfinding process
4794.D2.5	Create a design brief
4794.D2.6	Describe and apply scientific truth finding
4794.D2.7	Describe and apply problem solving techniques
Domain	***Documenting Design Work***
4794.D3.1	Students prepare organized and relative documentation of the design process for their solutions of final products.
4794.D3.2	Explain the importance of a portfolio
4794.D3.3	Develop sketching and principles of visualization skills to document work
4794.D3.4	Prepare working drawings including orthographic projections, isometrics, and perspective – using appropriate drawing styles and techniques
4794.D3.5	Use CAD workstations and appropriate software
4794.D3.6	Prepare graphs and explain how they relate information
4794.D3.7	Develop a portfolio
Domain	***Investigation and Research***
4794.D4.1	Students synthesize information obtained through appropriate resources that are in direct relation to the problem's solution.
4794.D4.2	Collect data and information to be used to solve a problem
4794.D4.3	Apply questions in a proper way to collect information
4794.D4.4	Describe and conduct an interview process
4794.D4.5	Apply appropriate investigative strategies
4794.D4.6	Identify and describe good sources for research and appropriately document all resources
4794.D4.7	Evaluate resources with regards to the identified problem
Domain	***Designing Systems***
4794.D5.1	Students design solutions using their knowledge of technological systems for developing innovative solutions.
4794.D5.2	Identify and describe the basic parts of a technological system
4794.D5.3	Describe and design a structural system
4794.D5.4	Describe and design a mechanical system
4794.D5.5	Describe and design an electronic system
4794.D5.6	Describe and design a pneumatic system

Domain	***Generating and Developing Ideas***
4794.D6.1	Students choose techniques to foster creative solutions to a design problem.
4794.D6.2	Define and describe types of cognitive thinking
4794.D6.3	Apply cognitive techniques of thinking to identified problems
4794.D6.4	Define and describe brainstorming techniques
4794.D6.5	Use research to formulate ideas
4794.D6.6	List and describe the components of a design
4794.D6.7	Apply brainstorming techniques to develop many possible solutions
4794.D6.8	Explain the human, social and environmental issues that affect the design solutions
4794.D6.9	Analyze ethical issues in choosing design solutions
4794.D6.10	Apply decision techniques to choose solutions based on appropriate criteria
Domain	***Materials, Prototyping and Testing***
4794.D7.1	Students validate solutions through material selection, modeling, prototyping and testing of their final product or system.
4794.D7.2	Differentiate the major physical properties of materials
4794.D7.3	Identify and describe the major classifications of materials
4794.D7.4	Define and illustrate modeling and prototyping
4794.D7.5	List five materials that can be used for modeling
4794.D7.6	Produce ways to present test results
4794.D7.7	Apply and adapt methods of evaluating design work
4794.D7.8	Conduct and document product tests
Domain	***Presenting Design Solutions***
4794.D8.1	Students prepare presentations of final design solutions to be critiqued by others.
4794.D8.2	Compare methods that are used to communicate a design solution
4794.D8.3	Create a presentation showing the steps used in the design process
4794.D8.4	Present a product for critique
4794.D8.5	Demonstrate professional presentation techniques
Domain	***Aesthetic Design***
4794.D9.1	Students demonstrate artistic fundamentals which are utilized throughout the design process to solve visual problems and communicate ideas for a product or system.
4794.D9.2	Identify the knowledge and skills gained in art experiences that transfer to the design process
4794.D9.3	Analyze the effective use of symbols, elements, principles, and media using appropriate terminology
4794.D9.4	Construct insightful, convincing interpretations of products or systems by identifying problematic features, forming theories, and evaluating alternative theories
4794.D9.5	Engage in critical reading, writing, and discourse to improve understanding of own work and that of others
4794.D9.6	Demonstrate skill in perception from real life to present convincing representation of objects or subject matter
4794.D9.7	Select subject matter, symbols, and ideas to communicate statements to the consumer
4794.D9.8	Engage in philosophical inquiry into the nature of aesthetic issues independently or with others
4794.D9.9	Make informed choices about specific subject matter or concepts and defend those choices when given a range of objects or spaces

4794.D9.10	Appropriate symbols and metaphors from art and design and describe their origin, function, and value in the solutions
4794.D9.11	Demonstrate thoughtful revision and refinement of original design solutions based upon reflection, critique, practice, and research
4794.D9.12	Examine and establish criteria for judging excellence in work and revise and refine work through analysis, synthesis, peer critique, and self-evaluation, utilizing established criteria for the purpose of creating portfolio level work
4794.D9.13	Evaluate the effectiveness of elements and principles in other design solutions and use this evaluation to inform personal work
4794.D9.14	Create multiple solutions in works that demonstrate competence in producing effective relationships between elements, media, and function
4794.D9.15	Create design solutions that use specific elements, principles, and functions to solve problems and communicate ideas
4794.D9.16	Create design solutions that demonstrate skill and understanding of different media, processes and communicate ideas
4794.D9.17	Begin, define, and solve challenging visual problems, demonstrating skill and in-depth understanding of media and processes

Computers in Design & Production	
Career Cluster	Advanced Manufacturing
Program of Study	
NLPS Sequence	Introductory
Course Code	4800
Course Description	*Computers in Design and Production is a course that specializes in using modern technological processes, computers, design, and production systems in the production of products and structures through the use of automated production systems. Emphasis is placed on using modern technologies and on developing career related skills for electronics, manufacturing, precision machining, welding, and architecture career pathways. Students apply ingenuity using tools, materials, processes, and resources to create solutions as it applies in the electronics, manufacturing, precision machining, welding, and architecture. The content and activities should be developed locally in accordance with available advanced technologies in the school. Course content should address major technological content related to topics such as: Architectural drawing and print design, design documentation using CAD systems; assignments involving the interface of CAD, CNC, CAM, and CIM technologies; computer simulation of products and systems; publishing of various media; animation and related multimedia applications; 3-D modeling of products or structures; digital creation and editing of graphics and audio files; control technologies; and automation in the modern workplace.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum

Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	Introductory	
Bulletin 400	● Industrial Arts 7-12, K12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist: Computers in Design & Production	
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Computers in Design & Production	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Core Concepts***
4800.D1.1	Students apply concepts of the design process using writing, math, and CAD skills for solving a design problem
4800.D1.2	Identify components related to the design process
4800.D1.3	Describe the steps in the design process
4800.D1.4	Describe the elements and principles of design.
4800.D1.5	Make and use measurements in both traditional and metric unit
4800.D1.6	Apply and adapt the design process from conception through verification of a simple component or system
4800.D1.7	Review CAD drawing design
4800.D1.8	Demonstrate drafting concepts and the use of drafting tools

4800.D1.9	Develop an understanding of geometry related to technical drawing and actual production objects
4800.D1.10	Apply concepts of 3D CAD drawing and animation during the design process.
4800.D1.11	Use “real world” measuring tools and teaming concepts to create production models.
4800.D1.12	Solve technical mathematical problems.
4800.D1.13	Create multi-view drawings using 2D and 3D CAD.
4800.D1.14	Develop 3-D product models using solid modeling and parametric CAD software.
4800.D1.15	Understand concept sketching.
4800.D1.16	Create a presentation of a design using various methods.
4800.D1.17	Utilize Computer Aided Drafting (CAD) skills to produce drawings.
4800.D1.18	Identify common terms and definitions relating to Computer Aided Drafting.
4800.D1.19	Write a descriptive report on some aspect of the design process and how it relates to a project.
Domain	***Electronics***
4800.D2.1	Students verify electronic concepts for use in electronic schematics.
4800.D2.2	Design basic electronic schematics.
4800.D2.3	Identify and describe basic electronic laws.
4800.D2.4	Describe AC/DC concepts.
4800.D2.5	Apply basic logic found in electronics.
4800.D2.6	Identify symbols used in creating schematics.
4800.D2.7	Recognize and explain the functions of electronic components.
Domain	***Advanced Manufacturing***
4800.D3.1	Students integrate advanced manufacturing concepts in the design process to develop projects.
4800.D3.2	Apply the principles of mold design for a variety of products.
4800.D3.3	Identify necessary mold materials, stress and strength calculations, machining, fabricating, and testing in processing equipment needed to produce a product.
4800.D3.4	Describe the design of the manufacturing process as required by product design specifications.
4800.D3.5	Identify the selection of processes, tooling, work-holding, gauging, routing, and material handling, as developed for a manufacturing production simulation.
4800.D3.6	Demonstrate process planning, cost and efficiency analysis.
4800.D3.7	Demonstrate planning for ergonomics, robotics, machine tools, coordinate-measuring machines, and custom automation for a product.
4800.D3.8	Use simulation software to design a factory layout and material-flow simulation.
4800.D3.9	Design for product-ability and manufacturing ease.
4800.D3.10	Understand how robots operate in a work cell.
4800.D3.11	Incorporate print reading for applications.
Domain	***Precision Machining***
4800.D4.1	Students choose precision machining concepts to use in creating a solution.
4800.D4.2	Explain the practical considerations associated with the use of FEA (Finite Element Analysis) with respect to product stress and strain analysis.
4800.D4.3	Identify geometric dimensioning and tolerancing, and surface texture specifications.
4800.D4.4	Identify a wide range of rapid prototyping technologies and materials.
4800.D4.5	Explain why rapid prototyping is a useful technique in designing a product.
4800.D4.6	Convert/create products using modeling software, convert drawings using appropriate software and produce a product using a rapid prototyping technique.

4800.D4.7	Demonstrate the ability to model/prototype to scale.
4800.D4.8	Understand and practice orthographic projection drawings as related to practical applications.
4800.D4.9	Understand and practice axonometric projection drawings related to practical applications.
4800.D4.10	Demonstrate robotics programming and CAD/CAM/CNC programming for producing the instruction codes necessary to manufacture parts with NC machine tools are emphasized.
4800.D4.11	Incorporate precision tool reading for applications.
4800.D4.12	Show understanding of coordinate systems.
Domain	***Welding***
4800.D5.1	Students recommend welding methods to be used on a particular type of material in accordance with the use of the product.
4800.D5.2	Identify welding types through finite/stress analysis.
4800.D5.3	Incorporate print reading for applications.
4800.D5.4	Identify welding symbols used in drawings.
4800.D5.5	Describe different types of welding.
Domain	***Architecture***
4800.D6.1	Students integrate architecture concepts in the design process to develop projects.
4800.D6.2	Demonstrate an understanding of various historical house styles.
4800.D6.3	Assess space planning for occupant use.
4800.D6.4	Recognize and explain how building codes and ordinances affect design.
4800.D6.5	Identify the drawings required for residential construction.
4800.D6.6	Create architectural blueprints.
4800.D6.7	Select the appropriate scale using an architect's scale.
4800.D6.8	Identify and apply architectural symbols used in drawings.
4800.D6.9	Identify the proper use of site analysis.
4800.D6.10	Demonstrate knowledge of roof systems, terminology, style, and construction.
4800.D6.11	Identify various styles of roof systems.
4800.D6.12	Explain the purpose of elevations.
4800.D6.13	Evaluate different foundation systems and terminology.
4800.D6.14	Analyze mechanical systems present in residential construction.
Domain	***Careers in Electronics, Adv Manufacturing, Precision Machining, Welding, and Architecture.***
4800.D7.1	Students evaluate potential career opportunities in electronics, advanced manufacturing, precision machining, welding, and architecture.
4800.D7.2	Research electronics, advanced manufacturing, precision machining, welding, and architecture careers.
4800.D7.3	Find electronics, advanced manufacturing, precision machining, welding, and architecture opportunities offered by a technical school or college.
4800.D7.4	Determine electronics, advanced manufacturing, precision machining, welding, and architecture occupation wages/salaries.
4800.D7.5	Research electronics, advanced manufacturing, precision machining, welding, and architecture job outlook information.

Introduction to the Energy Industry		
Career Cluster	Advanced Manufacturing	
Program of Study		
NLPS Sequence		
Course Code	5614	
Course Description	*Introduction to the Energy Industry provides students with an understanding of the occupations in the energy industry and the education and training to enter and advance in careers in the field. Students will explore all aspects of the energy industry including nuclear, natural gas and renewable energy. Schools certified through the Center for Energy Workforce Development (CEWD) can offer their students the opportunity to earn the Energy Industry Fundamentals Certificate.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Introductory	
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● CTE: Trade & Industry: Energy Industry 5-12 ● Workplace Specialist: Energy Industry 9-12 ● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		

Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
4803.D1.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
4803.D1.2	Explain the benefits and responsibilities of being a member of a CTSO.
4803.D1.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
4803.D1.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
4803.D2.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
4803.D2.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster
4803.D2.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
4803.D2.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society
4803.D2.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest
4803.D2.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
4803.D2.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster

Advanced Career & Technical Education, College Credit: STEM	
Career Cluster	Advanced Manufacturing
Program of Study	
NLPS Sequence	
Course Code	6126
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited post-secondary institution through an*

	adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint program of study involving a postsecondary partnership.
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Industrial Arts 7-12, K12
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12
Rules 2002	● Technology Education with high school setting ● Workplace Specialist: Computers in Design & Production
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Computers in Design & Production
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Engineering Essentials		
Career Cluster	Advanced Manufacturing	
Program of Study		
NLPS Sequence	Introductory	
Course Code	7199	
Course Description	*Engineering Essentials is designed as a first-exposure experience to inspire students of all backgrounds to explore the breadth of engineering-related career opportunities. Throughout the course, students explore global engineering challenges and sustainability goals, the impact of engineering, and the variety of career paths available to them. Students will understand the various disciplines within the engineering field, approach and solve problems in different ways, use a variety of industry tools, and build an engineering mindset.* ***NOTE:*** *This course aligns with the PLTW Engineering Essentials curriculum. Use of the PLTW curriculum may require additional training and membership in the PLTW network.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes	**Note**: Schools that have agreed to be part of the Project Lead the Way network must follow all training and data collection requirements **Note**: This course qualifies for funding at the 8th grade level	
ADDITIONAL COURSE INFO		
Funding	Introductory	Available for 8th grade
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12 ● Standard Trade & Industrial: Drafting K-12	
Rules 46-47	● Industrial Technology K-12 ● Standard Trade & Industrial: Engineering 9-12 ● Standard Trade & Industrial: Drafting 9-12 ● Occupational Specialist I, II or III: Drafting 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Engineering 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering ● Workplace Specialist: Engineering ● CTE: Trade & Industrial: Drafting & Computer Aided Design (CAD) ● Workplace Specialist: Drafting & Computer Aided Design (CAD)	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Engineering 5-12	

	● Workplace Specialist: Engineering 9-12 ● CTE: Trade & Industrial Drafting & Computer Aided Design (CAD) 5-12 ● Workplace Specialist: Mechanical Drafting 9-12 ● Workplace Specialist: Architectural Drafting 9-12 ● Workplace Specialist: Architectural Engineering 9-12 ● CTE: Trade & Industrial: Architecture 5-12 ● Workplace Specialist: Architecture 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
4803.D1.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
4803.D1.2	Explain the benefits and responsibilities of being a member of a CTSO.
4803.D1.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
4803.D1.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
4803.D2.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
4803.D2.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster
4803.D2.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
4803.D2.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society
4803.D2.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and

	examine how personal career aptitudes align with careers in a field or pathway of interest
4803.D2.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
4803.D2.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster
Domain	***Nature of Engineering and Design***
7199.D3.1	Understand the multitude of factors which guide the development of engineering and technological design
7199.D3.2	Consider how STEM principles led to the development of a product or system.
7199.D3.3	Conduct research to inform intentional inventions and innovations that address specific needs and wants.
7199.D3.4	Develop a plan that incorporates knowledge from science, mathematics, and other disciplines to design or improve a technological product or system.
Domain	***Engineering Concepts***
7199.D4.1	Demonstrate the use of conceptual, graphical, virtual, mathematical, and physical modeling to identify conflicting considerations before the entire system is developed and to aid in design decision making.
7199.D4.2	Analyze the stability of a technological system and how it is influenced by all of the components in the system, especially those in the feedback loop.
7199.D4.3	Select resources that involve tradeoffs between competing values, such as availability, cost, desirability, and waste while solving problems.
7199.D4.4	Cite examples of the criteria and constraints of a product or system and how they affect final design.
7199.D4.5	Implement quality control as a planned process to ensure that a product, service, or system meets established criteria.
7199.D4.6	Use management processes in planning, organizing, and controlling work.
Domain	***Technology in Practice***
7199.D5.1	Evaluate how technology enhances opportunities for new products and services through globalization.
7199.D5.2	Connect technological progress to the advancement of other areas of knowledge and vice versa.
7199.D5.3	Evaluate ways that technology can impact individuals, society, and the environment
7199.D5.4	Evaluate how technologies alter human health and capabilities.
7199.D5.5	Evaluate a technological innovation that arose from a specific society's unique need or want.
Domain	***Influence of Design***
7199.D6.1	Determine the best approach by evaluating the purpose of the design.
7199.D6.2	Document trade-offs in the technology and engineering design process to produce the optimal design.
7199.D6.3	Optimize a design by addressing desired qualities within criteria and constraints.

7199.D6.4	Apply principles of human-centered design.
7199.D6.5	Illustrate principles, elements and factors of design.
7199.D6.6	Implement the best possible solution to a design.
7199.D6.7	Apply a broad range of design skills to their design process.
7199.D6.8	Apply a broad range of making skills to their design process.
Domain	***Communication of Engineering Principles***
7199.D7.1	Use various approaches to communicate processes and procedures for using, maintaining, and assessing technological products and systems.
7199.D7.2	Develop a device or system for the marketplace.
7199.D7.3	Apply appropriate methods to diagnose, adjust and repair systems to ensure precise, safe and proper functionality.
7199.D7.4	Synthesize data and analyze trends to make decisions about technological products, systems, or processes.

Advanced Manufacturing Biotechnology							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7340	Principles of Biotechnology	7341	Biotech Manufacturing	7343	Advanced Biotech Manufacturing	7344	Biotechnology Capstone
				7342	Biotech Regulatory Affairs		

Principles of Biotechnology		
Career Cluster	Advanced Manufacturing	
Program of Study	Biotechnology	
NLPS Sequence	A	
Course Code	7340	
Course Description	*Principles of Biotechnology presents an in-depth overview of biotechnology emphasizing basic molecular techniques of manipulating DNA; processes involved in protein purification and analysis; microbial, plant, aquatic, medical and animal biotechnology; regulations and ethics of the biotechnology industry.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● No License Available	
Rules 2002	● No License Available	
REPA/REPA 3	● Life Science 5-12 ● Chemistry 5-12 ● CTE: T&I: Biotechnology ● Workplace Specialist: Biotechnology	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	BIOT 100: Survey of Biotechnology
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT Biopharmaceutical Manufacturing (51.2006); CT Medical Device Quality (41.0000)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Biotechnology Foundations***
7340.D1.1	Demonstrate appropriate documentation practices.
7340.D1.2	Describe and apply safety rules.
7340.D1.3	Learn and use various laboratory tools and measurements.
7340.D1.4	Use and prepare solutions of varying concentration.
Domain	***Survey of Biotechnology***
7340.D2.1	Understand basic molecular genetics as it applies to organismal genomes.
7340.D2.2	Describe processes of recombinant DNA technology and DNA cloning.
7340.D2.3	Understand the importance of information technology in the field of bioinformatics.
7340.D2.4	Discuss uses, purification, and analysis of proteins as biotechnology products.
7340.D2.5	Describe the uses of microorganisms as tools of biotechnology.
7340.D2.6	Define the major mechanisms of plant transgenesis and discuss their applications.
7340.D2.7	Review the use of transgenic and cloned animals in biotechnology research.
7340.D2.8	Understand the processes of DNA fingerprinting and forensic analysis.
7340.D2.9	Describe processes and products of medical biotechnology.
7340.D2.10	Understand government regulations that guide the biotechnology industry.
7340.D2.11	Discuss the ethics of using and manipulating living organisms for human benefit.
7340.D2.12	Understand the impact of biotechnology on agriculture, food production, medical and environmental applications, and biofuels through various types of interaction with the local industry including a field trip.
Domain	***Career Navigation***
7340.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7340.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7340.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.

7340.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7340.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7340.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7340.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7340.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7340.D5.1	Demonstrate computer literacy skills and basic computer functions.
7340.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7340.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7340.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Biotech Manufacturing		
Career Cluster	Advanced Manufacturing	
Program of Study	Biotechnology	
NLPS Sequence	B	
Course Code	7341	
Course Description	*Biotech Manufacturing introduces students to the basics of design and manufacturing within the biotechnology industry, gaining an understanding of the work environment. Students will learn a brief history of the Food and Drug Administration, then will learn how the practices set forth by the FDA control the work environment and the behavior of workers in the field. This course prepares students for the most basic entry level position in this regulated industry.*	
Prerequisite(s)/ Corequisite(s)	Principles of Biotechnology	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as STEM-Focused credit under the new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I

Bulletin 400	● No License Available
Rules 46-47	● No License Available
Rules 2002	● No License Available
REPA/REPA 3	● Life Science 5-12 ● Chemistry 5-12 ● CTE: T&I: Biotechnology ● Workplace Specialist: Biotechnology
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BIOT 102: Survey of Good Manufacturing Practices; BIOT 103: Safety and Regulatory Compliance for Biotechnology
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT Biopharmaceutical Manufacturing (51.2006); CT Medical Device Quality (41.0000)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Manufacturing Practices***
7341.D1.1	Demonstrate the ability to follow laboratory safety procedures and precautions through hands-on lab activities.
7341.D1.2	Demonstrate awareness of risks associated with a biotechnology laboratory and be able to create a chemical hygiene plan for that laboratory.
7341.D1.3	Know how a laboratory should be prepared for emergency situations.
7341.D1.4	Identify and be able to safely handle, store and dispose of hazardous, biological, and chemical and radioactive materials.
7341.D1.5	Identify and be able to use personal protective equipment (PPE) under the appropriate conditions.
7341.D1.6	Follow the appropriate safety procedures and guidelines with reference to physical hazards in the laboratory.
7341.D1.7	Identify and understand the role of regulatory agencies for which compliance is important in biotechnology.
7341.D1.8	Develop an understanding of the scientific basis for regulatory compliance in biotechnology.
7341.D1.9	Demonstrate the ability to understand and follow written technical instructions.
7341.D1.10	Demonstrate the skills of good documentation.
7341.D1.11	Interpret and follow GXPs and SOPs and locate the resources that provide updates.

7341.D1.12	Identify and understand validation methods as they apply to biotechnology.
7341.D1.13	Research and analyze intellectual property and its impact on biotechnology.
7341.D1.14	Assess readiness to take OSHA 10 Hour General Industry Certification exam.
Domain	***Regulatory Practices***
7341.D2.1	Understand the unique manufacturing environment as well as the special terminology used in the biotechnology industry.
7341.D2.2	Identify the steps of the basic product life cycle (manufacturing and regulatory) for pharmaceuticals and medical devices.
7341.D2.3	Know the history of the current regulatory environment for the biotechnology industry.
7341.D2.4	Understand CGMPs and how they form the industry environment.
7341.D2.5	Understand how the CGMPs and the nature of biotechnology manufacturing result in a unique work environment.
7341.D2.6	Understand what is done to prevent contamination, both in the work environment and the individuals working in that environment, and the consequences of contamination through hands-on lab activities including environmental monitoring, aseptic gowning, and aseptic handling.

Biotech Regulatory Affairs		
Career Cluster	Advanced Manufacturing	
Program of Study	Biotechnology	
NLPS Sequence	C	
Course Code	7342	
Course Description	*Biotech Regulatory Affairs provides an entry level introduction to the laws and regulations that govern the development, marketing and commercial distribution of drugs, biological and medical device products and how they relate to the pharmaceutical, biotechnology and medical device industry. This course is intended to provide individuals with a greater understanding of regulatory affairs, specifically providing an understanding of how their actions are controlled by regulations and how to interact with FDA or global regulatory agencies.*	
Prerequisite(s)/ Corequisite(s)	Principles of Biotechnology, Biotech Manufacturing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as STEM-Focused credit under the new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No License Available	

Rules 46-47	● No License Available
Rules 2002	● No License Available
REPA/REPA 3	● Life Science 5-12 ● Chemistry 5-12 ● CTE: T&I: Biotechnology ● Workplace Specialist: Biotechnology
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BIOT 105: Survey of Regulatory Affairs
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT Biopharmaceutical Manufacturing (51.2006)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Survey of Regulatory Affairs***
7342.D1.1	Demonstrate the ability to understand the biomanufacturing drug process.
7342.D1.2	Demonstrate awareness of the medical device process and various reporting compliance.
7342.D1.3	Locate information students might need in their role as a regulatory professional.
7342.D1.4	Demonstrate the ability to understand and discuss Biotechnology and Medical Device Industries guidance and regulations.
7342.D1.5	Identify and be able to describe global U.S. drug and device regulations.
7342.D1.6	Demonstrate the ability to differentiate the product life cycles including preclinical, clinical, and marketing regulatory processes.
7342.D1.7	Identify and understand the role of regulatory agencies and the regulatory affairs professional.
7342.D1.8	Demonstrate the ability to understand the Drug/Biologics and Medical Device Process and Risk Management.
7342.D1.9	Demonstrate the skills of good documentation.
7342.D1.10	Demonstrate the ability to understand the purpose, outcomes, goals and regulatory processes regarding internal audits and FDA audits.
7342.D1.11	Interpret proposed regulations and guidance and locate the resources that provide updates approval process.

Advanced Biotech Manufacturing		
Career Cluster	Advanced Manufacturing	
Program of Study	Biotechnology	
NLPS Sequence	C	
Course Code	7343	
Course Description	*Advanced Biotech Manufacturing will introduce students to the key industrial technology knowledge and skills required in the manufacturing of pharmaceuticals and/or medical devices. Students will learn the basics of fluid power and metrology. Students will apply these skills through lecture, lab, and simulations.*	
Prerequisite(s)/ Corequisite(s)	Principles of Biotechnology, Biotech Manufacturing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as STEM-Focused credit for the new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● No License Available	
Rules 2002	● No License Available	
REPA/REPA 3	● Life Science 5-12 ● Chemistry 5-12 ● CTE: T&I: Biotechnology ● Workplace Specialist: Biotechnology	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	DESN 101: Intro to Design Technology*; INDT 108: Metrology*	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Biopharmaceutical Manufacturing (51.2006); CT Medical Device Quality (41.0000)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Design Technology***
7343.D1.1	Exercise file management and printing/plotting practices.
7343.D1.2	Understand the role of various types of drawings as applied to the design process.
7343.D1.3	Research the potential career fields in Design Technology.
7343.D1.4	Effectively communicate spatial visualizations with appropriate choices of technical drawings.
7343.D1.5	Demonstrate appropriate application of drawing standards to technical sketches and working drawings.
7343.D1.6	Collaborate in a studio setting.
Domain	***Metrology***
7343.D2.1	Discuss the reasons for measurement and the various systems used.
7343.D2.2	Develop skills in precision measurement and layout procedures for a variety of measuring instruments and applications.
7343.D2.3	Understand and perform measuring instrument calibration.
7343.D2.4	Read prints, interpret drawings, and understand specifications and work within tolerance
7343.D2.5	Integrate new technology into existing structures and processes using innovative and creative approaches.
7343.D2.6	Understand and apply the concepts of measurement, gauging and tolerances
7343.D2.7	Develop and apply tolerance, limits, and fits to meet manufacturing requirements
7343.D2.8	Prepare clear, concise, and accurate technical reports.
7343.D2.9	Think critically and independently, analyze, synthesize, and evaluate technical problems and information.
7343.D2.10	Solve problems and make decisions using formal process methods.
7343.D2.11	Solve mathematical problems related to inspection, gauging and layout.
7343.D2.12	Verbally communicate clearly, concisely, and convincingly with others.
7343.D2.13	Demonstrate ability to read and interpret technical documents.
7343.D2.14	Demonstrate ability to use various types of software applicable to course.

Biotechnology Capstone	
Career Cluster	Advanced Manufacturing
Program of Study	Biotechnology
NLPS Sequence	D
Course Code	7344
Course Description	*The Biotechnology Capstone course focuses on safety, quality, and manufacturing practices for Biotechnical manufacturing careers. The course can be customized to provide a focus on pharmaceutical manufacturing. Capstone content can be combined with outside experiences and credits can be applied to the Medical Device Quality CT, Biopharmaceutical*

	Manufacturing CT and the Biotechnology AAS (the degree requires Biology, but not the chemistry) at Ivy Tech. Students should have completed a college level Biology or Chemistry course prior to enrolling in the capstone course.
Prerequisite(s)/ Corequisite(s)	Principles of Biotechnology, Biotech Manufacturing, Advanced Biotech Manufacturing or Biotech Regulatory Affairs
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	Counts as STEM-Focused credit for the new diploma
Dual Credit Status	X (PCL/CTE)
Additional Notes	Students enrolled in this pathway should complete a college level Biology or Chemistry course prior to enrolling in this course.

ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● No License Available	
Rules 2002	● No License Available	
REPA/REPA 3	● Life Science 5-12 ● Chemistry 5-12 ● CTE: T&I: Biotechnology ● Workplace Specialist: Biotechnology	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BIOT 104: Quality Practices*; BIOT 106: Introduction to Biotechnology Laboratory*; BIOT 110: Pharmaceutical Manufacturing*
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT Biopharmaceutical Manufacturing (51.2006); CT Medical Device Quality (41.0000)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Quality Practices***
7344.D1.1	Understand basic quality terms and philosophies, including the construction and interpretation of basic quality tools.
7344.D1.2	Understand the benefits of quality as well as quality audits.

7344.D1.3	Describe the importance of workplace teams and understand and apply the various roles and responsibilities of team members.
7344.D1.4	Apply the basic principles of team formation and group dynamics.
7344.D1.5	Understand and apply continuous and process improvement tools and techniques, including six sigma, lean, benchmarking and incremental and breakthrough improvement.
7344.D1.6	Apply quality management and quality improvement tools, as well as analyze and monitor project management tools.
7344.D1.7	Apply basic statistics such as measures of central tendency and dispersion, frequency distributions, and probability and reliability concepts and use them in statistical process control.
7344.D1.8	Comprehend data types and collection methods, as well as sampling characteristics and methods.
7344.D1.9	Understand customers and suppliers, both internal and external, including tools used to gather their feedback.
7344.D1.10	Describe the process of validation of products and process and the importance of identification of materials for traceability purposes.
7344.D1.11	Apply the basic principles of corrective and preventative actions.
7344.D1.12	Develop an understanding of training within a medical device or pharmaceutical company through a field trip.
Domain	***Intro to Biotechnology***
7344.D2.1	Demonstrate appropriate documentation practices.
7344.D2.2	Describe and apply safety rules.
7344.D2.3	Learn and use various laboratory tools and measurements.
7344.D2.4	Use and prepare solutions of varying concentration.
7344.D2.5	Apply aseptic techniques.
7344.D2.6	Learn separation methods and identify unknown molecules.
7344.D2.7	Develop and use basic DNA manipulation techniques.
Domain	***Pharmaceutical Manufacturing***
7344.D3.1	Understand the overview of the pharmaceutical manufacturing operation.
7344.D3.2	Comprehend the regulatory guidelines and cGMP requirements overseeing the pharmaceutical product manufacturing.
7344.D3.3	Understand the major scientific specifications used in the parenteral product manufacturing.
7344.D3.4	Identify the major container closure systems.
7344.D3.5	Comprehend the filtration operation and validation methods.
7344.D3.6	Understand the science of lyophilization as well as the pharmaceutical manufacturing of lyophilized products including clean in place (CIP), steam in place (SIP), leak testing, qualification (IQ, OQ, PQ), process validation, system monitoring, automated processes and systems, QC release testing
7344.D3.7	Understand the aseptic vial filling operation and clean room designations.
7344.D3.8	Understand the capping and inspection processes.
7344.D3.9	Understand the regulatory guidelines on drug product labeling and packaging processes.

Advanced Manufacturing Design Technology							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
4802	Introduction to Engineering Design	7196	Mechanical and Architectural Design	7202	Manufacturing Principles and Design	7223	Mechanical Design Capstone
				7197	BIM Architecture	7225	Architectural Design Capstone

Introduction to Engineering Design		
Career Cluster	Advanced Manufacturing	
Program of Study	Design Technology, Electronics and Computer Technology, Engineering	
NLPS Sequence	A	
Course Code	4802	
Course Description	*Introduction to Engineering Design is a fundamental pre-engineering course where students become familiar with the engineering design process. Students work both individually and in teams to design solutions to a variety of problems using industry standard sketches and current 3D design and modeling software to represent and communicate solutions. Students apply their knowledge through hands-on projects and document their work with the use of an engineering notebook. Students begin with completing structured activities and move to solving open-ended projects and problems that require them to develop planning, documentation, communication, and other professional skills. Ethical issues related to professional practice and product development are also presented.* ***NOTE:*** *This course aligns with the PLTW Introduction to Engineering Design curriculum. Use of the PLTW curriculum may require additional training and membership in the PLTW network.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes	NOTE: Schools that have agreed to be part of the Project Lead the Way network must follow all training and data collection requirements.	
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12	

	● Standard Trade & Industrial: Drafting K-12
Rules 46-47	● Industrial Technology K-12 ● Standard Trade & Industrial: Engineering 9-12 ● Standard Trade & Industrial: Drafting 9-12 ● Occupational Specialist I, II or III: Drafting 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Engineering 9-12
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering ● Workplace Specialist: Engineering ● CTE: Trade & Industrial: Drafting & Computer Aided Design (CAD) ● Workplace Specialist: Drafting & Computer Aided Design (CAD)
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Engineering 5-12 ● Workplace Specialist: Engineering 9-12 ● CTE: Trade & Industrial Drafting & Computer Aided Design (CAD) 5-12 ● Workplace Specialist: Mechanical Drafting 9-12 ● Workplace Specialist: Architectural Drafting 9-12 ● Workplace Specialist: Architectural Engineering 9-12 ● CTE: Trade & Industrial: Architecture 5-12 ● Workplace Specialist: Architecture 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	DESN 101: Intro to Design Technology; DESN 113: 2D Computer-Aided Design
VU Course Alignment	DRAF 140: Introduction to CAD ▾
Four Yr. Course Alignment	USI - ENGR 121: Drafting & Annotation
Postsecondary Credential	VU - A.S. Product Design and Production (15.1306) USI - B.S.E. in Engineering (14.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Intro to Design***
4802.D1.1	Exercise file management and printing/plotting practices.
4802.D1.2	Understand the role of various types of drawings as applied to the design process.
4802.D1.3	Research potential career fields in Design Technology and Engineering.
4802.D1.4	Effectively communicate spatial visualizations with appropriate choices of technical drawings.
4802.D1.5	Demonstrate appropriate application of drawing standards to technical sketches and working

	drawings.
4802.D1.6	Collaborate in a studio setting.
4802.D1.7	Demonstrate relevant safety practices when using tools and equipment as determined by task, materials, environment, and protective attire.
4802.D1.8	Apply corrective action(s) to eliminate hazards.
4802.D1.9	Explain the importance of design documentation.
4802.D1.10	Apply sketching and annotation skills to document work.
4802.D1.11	Produce working drawings using appropriate drawing styles and techniques.
4802.D1.12	Formulate unbiased research questions to collect information/data and apply investigative strategies.
4802.D1.13	Select resources that are appropriate for academic research and relevant to the identified problem.
4802.D1.14	Discuss historical and current events related to engineering and technology and analyze the impact on society.
4802.D1.15	Discuss the importance of ethics in engineering design.
4802.D1.16	Synthesize information collected during the research process.
Domain	***Design Process***
4802.D2.1	Describe the steps in the design process.
4802.D2.2	Generate a valid and justifiable problem.
4802.D2.3	Create a design brief by constructing a problem and design statement and identifying problem constraints.
4802.D2.4	Apply the steps of the design process as they are used to solve the problem.
4802.D2.5	Describe the iterative nature of the design loop.
4802.D2.6	Discuss how the design process impacts the outcome when designing solutions to problems.
4802.D2.7	Implement design briefs in the problem-solving process.
4802.D2.8	Collaborate on engineering projects by working in design teams to solve valid problems.
4802.D2.9	Examine a design (product) with respect to its quality and usability.
4802.D2.10	Assess and refine original design solutions based upon reflection, critique, practice, and research.
Domain	***2D Computer Aided Design***
4802.D3.1	Create and use a template drawing.
4802.D3.2	Manipulate advanced dimensioning variables.
4802.D3.3	Use advanced editing commands.
4802.D3.4	Create blocks and form a symbol library.
4802.D3.5	Assign data/attributes to blocks.
4802.D3.6	Apply section lines to various types of drawing parts.
4802.D3.7	Create drawings using an isometric approach.
4802.D3.8	Share data utilizing external references.
4802.D3.9	Set up a plotter and plot a drawing.
Domain	***Additional Technical Drawing***
4802.D4.1	Distinguish between line types utilized on a technical drawing per industry standard (ANSI Line Conventions and Lettering Y14.2M-2008).
4802.D4.2	Interpret and develop appropriate annotations for technical drawings.
4802.D4.3	Differentiate between the various types of tolerances.
4802.D4.4	Analyze types of fits in relation to mating parts.

4802.D4.5	Collect and display data related to the sizes and shapes of objects utilizing various measuring tools.
4802.D4.6	Determine the appropriate number of views, including alternate views (auxiliary, section, detail), to fully document the details of a design.
4802.D4.7	Identify and produce various pictorial drawings including isometric, oblique, and perspective drawings for technical drawing representations.
4802.D4.8	Differentiate when the physical properties of geometric shapes can be utilized to optimize design solutions.
4802.D4.9	Apply industry accepted dimensioning practices to technical drawings to annotate design features.
4802.D4.10	Identify and produce multi-view drawings in proper orientation, scale, and proportion through methods of orthographic projection.
4802.D4.11	Illustrate and calculate mathematical problems related to real world situations involving characteristics of geometric shapes and solids.
Domain	***Reverse Engineering***
4802.D5.1	Identify visual, functional, and structural properties of a product.
4802.D5.2	Differentiate between invention and innovation.
4802.D5.3	Describe the relationship between reverse engineering and product/system improvement.
4802.D5.4	Create an innovation to a system or product using information obtained from a product analysis.
4802.D5.5	Evaluate the effectiveness of elements and principles in other design solutions and use analysis to revise original design.
4802.D5.6	Perform mathematical calculations to identify structural properties of a product.
Domain	***Modeling***
4802.D6.1	Formulate methods of communicating designs using various forms of modeling such as conceptual, graphical, mathematical, physical or computer modeling.
4802.D6.2	Utilize appropriate modeling materials to construct a physical model such as a prototype or mock-up.
4802.D6.3	Interpret the details of a sketch and generate physical or computer models using appropriate modeling materials and techniques.
4802.D6.4	Recognize and utilize constraints such as dimensional, geometric, assembly and parametric constraints in regard to modeling.
4802.D6.5	Identify the six degrees of freedom of a component floating in space in the context of an assembly.
4802.D6.6	Differentiate between assemblies and subassemblies and their appropriate use.
4802.D6.7	Use engineering design equipment (3D modeling software, 3D printer, etc.) to create 3D and 2D models to document engineering design. (Move to modeling)
4802.D6.8	Analyze the remaining degrees of freedom of mating components after systematically applying assembly constraints until only desired components are allowed to move.
4802.D6.9	Apply visual design principles to enhance the aesthetic appeal of a design solution.
4802.D6.10	Analyze products or systems by identifying problematic features to generate potential solution(s).
Domain	***Career Navigation***
4802.D6.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.

4802.D6.2	Understand the specialized skills needed for different career opportunities related to the program of study.
4802.D6.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
4802.D6.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
4802.D7.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
4802.D7.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
4802.D7.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
4802.D7.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
4802.D8.1	Demonstrate computer literacy skills and basic computer functions.
4802.D8.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
4802.D8.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
4802.D8.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Mechanical and Architectural Design	
Career Cluster	Advanced Manufacturing
Program of Study	Design Technology
NLPS Sequence	B
Course Code	7196
Course Description	*Mechanical and Architectural Design provides students with a basic understanding of creating working drawings related to manufacturing detailing and assembly as well as a survey of Architectural design focused on the creative design of buildings. Topics include fastening devices, thread symbols and nomenclature, surface texture symbols, classes of fits, and the use of parts lists, title blocks and revision blocks. From an Architecture perspective, this course covers problems of site analysis, facilities programming, space planning, conceptual design, proper use of materials, and selection of structure and construction techniques.*
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	

Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12 ● Standard Trade & Industrial: Drafting K-12	
Rules 46-47	● Industrial Technology K-12 ● Standard Trade & Industrial: Engineering 9-12 ● Standard Trade & Industrial: Drafting 9-12 ● Occupational Specialist I, II or III: Drafting 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Engineering 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering ● Workplace Specialist: Engineering ● CTE: Trade & Industrial: Drafting & Computer Aided Design (CAD) ● Workplace Specialist: Drafting & Computer Aided Design (CAD)	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Engineering 5-12 ● Workplace Specialist: Engineering 9-12 ● CTE: Trade & Industrial Drafting & Computer Aided Design (CAD) 5-12 ● Workplace Specialist: Mechanical Drafting 9-12 ● Workplace Specialist: Architectural Drafting 9-12 ● Workplace Specialist: Architectural Engineering 9-12 ● CTE: Trade & Industrial: Architecture 5-12 ● Workplace Specialist: Architecture 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	DESN 104: Mechanical Graphics; DESN 105: Architectural Design I	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Computer-Aided Design (15.1302), TC Design Technology (15.1301)	
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, ENGL 111: English Composition or COMM 104: Workplace Communication, IVYT 113: Student Success in Technology	
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		

Competency #	Competency
Domain	***Mechanical Graphics***
7196.D1.1	Identify and draw various fastening devices.
7196.D1.2	Draw thread symbols and understand thread nomenclature.
7196.D1.3	Develop proper surface texture symbols.
7196.D1.4	Calculate classes of fits.
7196.D1.5	Develop a parts list.
7196.D1.6	Complete accurate title and revision blocks.
7196.D1.7	Research and utilize various standard parts.
7196.D1.8	Develop detailed part and assembly drawings.
Domain	***Architectural Design***
7196.D2.1	Identify the distinguishable design characteristics of the significant architectural styles in the history of Western civilization.
7196.D2.2	Comprehend and discuss the purpose and need for "facilities programming."
7196.D2.3	Develop sketches and diagrams that demonstrate problem solving of programmatic issues i.e., traffic flow, and material handling concepts.
7196.D2.4	Create design studies and drawings utilizing the views known as the Plan, Section and Elevation of a building.
7196.D2.5	Utilize fundamentals of formal conceptual relationships, design methodology and design process.
7196.D2.6	Develop basic spatial and compositional ideas introduced through the study of typology, diagrams, and a process of conceptualization.
7196.D2.7	Demonstrate an ability to represent ideas in form and space, as a conceptual and cultural response to program, type, basic building construction, architectural language and design methods.
7196.D2.8	Integrate history, theory, technology, and structures to influence formal and conceptual design manifested in materials, details, language and imagery.
7196.D2.9	Apply basic building codes in the context of social, political, civic, and environmental responsibilities relative to our society.
7196.D2.10	Develop and present oral presentations
7196.D2.11	Collaborate in a studio setting

Manufacturing Principles and Design	
Career Cluster	Advanced Manufacturing
Program of Study	Design Technology
NLPS Sequence	C
Course Code	7202
Course Description	*Manufacturing Principles and Design will challenge students will use 2D and 3D CAD skills to explore topics related to manufacturing principles and design. Students will gain an understanding of solid modeling and parametric solid modeling and use 3D printers to create industry part prints. Additionally, students will compare manufacturing practices like Lean*

	Manufacturing, design and program CNC processes, and use metrology tools and practices to evaluate an object.
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design; Mechanical and Architectural Design Fundamentals
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a quantitative reasoning course fore CORE 40 diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level I
Bulletin 400	● Standard Trade & Industrial: Drafting K-12 ● Industrial Arts 7-12
Rules 46-47	● Standard Trade & Industrial: Drafting 9-12 ● Occupational Specialist I, II or III: Drafting 9-12 ● Industrial Education K-12 ● Industrial Technology K-12
Rules 2002	● CTE: Trade & Industrial: Drafting & Computer Aided Design (CAD) ● Workplace Specialist: Drafting & Computer Aided Design (CAD) ● Technology Education with high school setting
REPA/REPA 3	● CTE: Trade & Industrial Drafting & Computer Aided Design (CAD) 5-12 ● CTE: Trade & Industrial: Drafting 5-12 ● Workplace Specialist: Drafting & Computer Aided Design 9-12 ● Workplace Specialist: Mechanical Drafting 9-12 ● Technology Education 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	DESN 195: Manufacturing Principles & Design; DESN 220: 3D Computer-Aided Design
VU Course Alignment	
Four Yr. Course Alignment	USI – MFET 103: Materials & Manufacturing Processes
Postsecondary Credential	ITCC - CT Computer-Aided Design (15.1302), TC Design Technology (15.1301) USI - B.S. in Manufacturing Engineering Technology (15.0613)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, ENGL 111: English Composition or COMM 104: Workplace Communication, IVYT 113: Student Success in Technology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Domain	***Manufacturing Principles and Design***
7202.D1.1	Describe and compare basic manufacturing practices (i.e., Six Sigma, Lean Manufacturing, Kaizen).
7202.D1.2	Develop drawings for a manufacturing facility layout.
7202.D1.3	Design and program introductory CNC processes.
7202.D1.4	Identify and describe material properties, testing, and applications.
7202.D1.5	Contrast and compare various manufacturing production techniques and systems.
7202.D1.6	Utilize metrology tools and practices in order to effectively evaluate and measure an object.
7202.D1.7	Identify the critical aspects of manufacturing workplace safety.
Domain	***3-D Computer Aided Design***
7202.D2.1	Understand the similarities and differences between solid modeling and parametric solid modeling.
7202.D2.2	Navigate 3D space.
7202.D2.3	Create and modify 3D models.
7202.D2.4	Create production drawings from 3D models.
7202.D2.5	Demonstrate proficiency with 3D Printers by making industry part prints.

BIM Architecture		
Career Cluster	Advanced Manufacturing	
Program of Study	Design Technology	
NLPS Sequence	C	
Course Code	7197	
Course Description	*BIM Architecture will introduce students to Building Information Modeling (BIM) which is an intelligent 3D model-based process that gives architecture, engineering, and construction professionals the insight and tools to better plan, design, and construct buildings. Students will deepen their skills in 3D CAD and learn to use BIM software to capture and analyze concepts and to prepare client presentations for Commercial Construction.*	
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Drafting K-12 ● Industrial Arts K-12	
Rules 46-47	● Standard Trade & Industrial: Drafting 9-12	

	● Occupational Specialist I, II or III: Drafting 9-12 ● Industrial Technology 9-12
Rules 2002	● CTE: Trade & Industrial: Drafting & Computer Aided Design (CAD) ● Workplace Specialist: Drafting & Computer Aided Design (CAD) ● Technology Education 5-12
REPA/REPA 3	● CTE: Trade & Industrial Drafting & Computer Aided Design (CAD) 5-12 ● Workplace Specialist: Architectural Drafting 9-12 ● Workplace Specialist: Drafting & Computer Aided Design 9-12 ● CTE: Trade & Industrial: Architecture 5-12 ● Workplace Specialist: Architecture 9-12 ● Technology Education 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	DESN 115: BIM Architecture*; DESN 220: 3D Computer-Aided Design
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Computer-Aided Design (15.1302), TC Design Technology (15.1301)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, ENGL 111: English Composition or COMM 104: Workplace Communication, IVYT 113: Student Success in Technology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***BIM Architecture***
7197.D1.1	Demonstrate basic skills in the usage and application of pull-down menus, commands, and building layouts.
7197.D1.2	Employ the use of families.
7197.D1.3	Illustrate the use of templates, title blocks and page layouts.
7197.D1.4	Successfully import AutoCAD documents and export 2D and 3D documents into CAD.
7197.D1.5	Create models that include building and site elements.
7197.D1.6	Demonstrate the ability to create interior and exterior elevations.
7197.D1.7	Annotate, manage, and modify notes and dimensions.
7197.D1.8	Develop Schedules.
7197.D1.9	Prepare Client Presentations for Commercial Construction
7197.D1.10	Collaborate in a studio setting.
Domain	***3D Computer - Aided Design***
7197.D2.1	Understand the similarities and differences between solid modeling and parametric solid modeling.

7197.D2.2	Navigate 3D space.
7197.D2.3	Create and modify 3D models.
7197.D2.4	Create production drawings from 3D models.
7197.D2.5	Demonstrate proficiency with 3D Printers by making industry part prints.

Mechanical Design Capstone		
Career Cluster	Advanced Manufacturing	
Program of Study	Design Technology	
NLPS Sequence	D	
Course Code	7223	
Course Description	*Mechanical Design Capstone covers a broad range of design techniques that are critical for the Manufacturing industry. Students will have the chance to study solid modeling techniques and design, fundamental principles of geometric dimensioning and tolerancing, Solidworks design software, and an introduction to additive manufacturing.*	
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design; Mechanical and Architectural Design Fundamentals; Manufacturing Principles and Design	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Standard Trade & Industrial: Drafting K-12 ● Industrial Arts 7-12	
Rules 46-47	● Standard Trade & Industrial: Drafting 9-12 ● Occupational Specialist I, II or III: Drafting 9-12 ● Industrial Education K-12 ● Industrial Technology K-12	
Rules 2002	● CTE: Trade & Industrial: Drafting & Computer Aided Design (CAD) ● Workplace Specialist: Drafting & Computer Aided Design (CAD) ● Technology Education with high school setting	
REPA/REPA 3	● CTE: Trade & Industrial Drafting & Computer Aided Design (CAD) 5-12 ● CTE: Trade & Industrial: Drafting 5-12 ● Workplace Specialist: Drafting & Computer Aided Design 9-12 ● Workplace Specialist: Mechanical Drafting 9-12 ● Technology Education 5-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	DESN 223: Parametric Solid Modeling*; DESN 227: Geometric Dimensioning and Tolerancing*; DESN 271: Introduction to Solidworks*; DESN 273: Design for Additive Manufacturing*
VU Course Alignment	
Four Yr. Course Alignment	USI – ME 121 – Solid Molding
Postsecondary Credential	ITCC - CT Computer-Aided Design (15.1302), TC Design Technology (15.1301), CT Mechanical Design (15.1306) USI - B.S.C.E. in Civil Engineering (14.0801)
Liberal Arts/Sciences Requirements	
Promoted Certifications	Certified SolidWorks Associate

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Parametric Solid Modeling***
7223.D1.1	Explain the different approaches to 3D modeling.
7223.D1.2	Create sketch-based features.
7223.D1.3	Choose an appropriate modeling scheme based on design intent.
7223.D1.4	Apply constraints in a parametric model and assembly to capture and implement desired design intent.
7223.D1.5	Create part models.
7223.D1.6	Edit models.
7223.D1.7	Create reference geometry.
7223.D1.8	Managing parent/child relationships.
7223.D1.9	Assemble components with constraints.
7223.D1.10	Apply materials and extract basic engineering properties.
7223.D1.11	Create and modify views for design communication (exploded, cutaway, etc.).
7223.D1.12	Generate a complete set of working drawings.
7223.D1.13	Create photo-realistic rendering of parts and assemblies.
7223.D1.14	Apply aspects of color, lighting, and texture.
7223.D1.15	Generate an animation.
Domain	***Geometric Dimensioning and Tolerances***
7223.D2.1	Identify and apply Geometric Dimensioning and Tolerancing symbols on drawings.
7223.D2.2	Understand the similarities and differences between coordinate and geometric dimensioning and tolerancing.
7223.D2.3	Describe the three-plane concept.
7223.D2.4	Apply datums to appropriate surfaces.

7223.D2.5	Understand the uses of and apply: Tolerances of orientation, Location tolerances, Tolerances of run-out, Tolerances of profile
Domain	***Introduction to SolidWorks***
7223.D3.1	Understand the similarities and differences between 2D sketches and 3D models.
7223.D3.2	Perform parametric sketching using geometric and dimensional constraints.
7223.D3.3	Manage and navigate the 3D modeling environment.
7223.D3.4	Incorporate design intent to create robust, easily edited 3D models.
7223.D3.5	Create, modify, and use 3D solid models.
7223.D3.6	Create assembly models of 3D components.
7223.D3.7	Create production drawings based on solid models and solid assemblies.
Domain	***Design for Additive Manufacturing***
7223.D4.1	Demonstrate basic additive manufacturing concepts and skills to print a design.
7223.D4.2	Operate and maintain 3D printing devices in conjunction with CAD software to manipulate designs and print objects.
7223.D4.3	Operate and maintain 3D scanning devices and determine how scanning is utilized in association with additive manufacturing processes.
7223.D4.4	Identify and perform basic safety practices, preventative maintenance practices, and general cleanup of 3D printers and 3D scanners.
7223.D4.5	Determine and perform appropriate post-processing techniques for different 3D printers.

Architectural Design Capstone	
Career Cluster	Advanced Manufacturing
Program of Study	Design Technology
NLPS Sequence	D
Course Code	7225
Course Description	*Architectural Design Capstone covers residential design and drafting. Topics include interior space planning, structural design and development of working drawings. The course provides opportunity for students to design a residence using accepted building standards and introduces various construction materials. Students will also learn advanced CAD design topics in architectural design. Completion of the entire course may also provide students the opportunity to understand basic surveying equipment and surveying techniques.*
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design; Mechanical and Architectural Design Fundamentals; BIM Architecture
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	

Funding	Moderate Value	Level II
Bulletin 400	● Standard Trade & Industrial: Drafting K-12 ● Industrial Arts K-12	
Rules 46-47	● Standard Trade & Industrial: Drafting 9-12 ● Occupational Specialist I, II or III: Drafting 9-12 ● Industrial Technology 9-12	
Rules 2002	● CTE: Trade & Industrial: Drafting & Computer Aided Design (CAD) ● Workplace Specialist: Drafting & Computer Aided Design (CAD) ● Technology Education 5-12	
REPA/REPA 3	● CTE: Trade & Industrial Drafting & Computer Aided Design (CAD) 5-12 ● Workplace Specialist: Architectural Drafting 9-12 ● Workplace Specialist: Drafting & Computer Aided Design 9-12 ● CTE: Trade & Industrial: Architecture 5-12 ● Workplace Specialist: Architecture 9-12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	DESN 204: Architectural Design II*; DESN 108: Residential Design*; DESN 109: Construction Materials and Specifications* *OR* DESN 210: Surveying*	
VU Course Alignment		
Four Yr. Course Alignment	USI - CE 321: Building Information Modeling	
Postsecondary Credential	ITCC - CT Computer-Aided Design (15.1302), TC Design Technology (15.1301), CT Architectural Design (15.1303) USI - B.S.C.E. in Civil Engineering (14.0801)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	Autodesk Certified User - Revit Exam	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Architectural Design***	
7225.D1.1	Identify and use architectural symbols to create plans and details.	
7225.D1.2	Lay out floor plans using application software.	
7225.D1.3	Lay out foundation plans using application software.	
7225.D1.4	Develop appropriate detail drawings.	
7225.D1.5	Construct building elevations and sections according to the plans established.	
7225.D1.6	Develop a site plan from surveying notes or given site data.	
7225.D1.7	Generate appropriate schedules for doors, windows, hardware, room finish, etc.	
Domain	***Residential Design***	

7225.D2.1	Distinguish good planning concepts and use them to establish a floor plan.
7225.D2.2	Determine structural requirements for a residence.
7225.D2.3	Design and layout the residential heating, plumbing and electrical systems.
7225.D2.4	Create a set of residential construction and presentation drawings.
7225.D2.5	Identify historical architectural styles and identify distinct characteristics of each.
7225.D2.6	Gather information from a client that is needed to design an architectural project.
7225.D2.7	Design floor plans to accommodate the needs of persons with physical impairments.
7225.D2.8	Apply the principles and elements of design to creating elevation drawings.
7225.D2.9	Recognize different roof styles as options for roof design.
7225.D2.10	Draw sections, using correct codes and proper dimensioning.
7225.D2.11	Relate the development of materials and construction methods to residential design.
7225.D2.12	Analyze a building site and orient a house to take advantage of solar energy and lot features.
Domain	***Construction Specifications***
7225.D3.1	Identify the 16 Divisions of the Construction Specifications Institute (CSI) Format.
7225.D3.2	Name the materials that are represented in each of the 16 Divisions of the CSI Format.
7225.D3.3	Recognize building materials and discuss their composition.
7225.D3.4	Calculate the volume requirements for structural materials including cubic yards, board feet, square feet, cubic feet, linear feet, and concrete block units.
7225.D3.5	Prepare materials lists for (given) construction phases of a small building.
7225.D3.6	Demonstrate knowledge of the legal aspects of contracts and bidding; types of construction documents including bonds; interpretation of technical building specifications and their application to selection and installation of materials, equipment and systems.
7225.D3.7	Explain the design and construction process and the roles of the different participants in the process.
7225.D3.8	Read, write, and edit construction specifications.
Domian	***Architectural Rendering***
7225.D4.1	Demonstrate the basics of scaled architectural perspective drawing using one-, two- and three-point methods.
7225.D4.2	Demonstrate competency in basic architectural rendering technique for textures, shade, and shadows.
7225.D4.3	Demonstrate competency in the composition and execution of a cohesive presentation using foreground, middle ground, background, and entourage.
7225.D4.4	Demonstrate the basics of color theory.

Advanced Manufacturing Electronics and Computer Technology							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
4802	Introduction to Engineering Design	7361	Electronic Fundamentals	5538	Digital Electronics	7362	Electronics and Computer Technology
						7098	Semiconductor Fabrication Capstone

Introduction to Engineering Design		
Career Cluster	Advanced Manufacturing	
Program of Study	Design Technology, Electronics and Computer Technology, Engineering	
NLPS Sequence	A	
Course Code	4802	
Course Description	*Introduction to Engineering Design is a fundamental pre-engineering course where students become familiar with the engineering design process. Students work both individually and in teams to design solutions to a variety of problems using industry standard sketches and current 3D design and modeling software to represent and communicate solutions. Students apply their knowledge through hands-on projects and document their work with the use of an engineering notebook. Students begin with completing structured activities and move to solving open-ended projects and problems that require them to develop planning, documentation, communication, and other professional skills. Ethical issues related to professional practice and product development are also presented. NOTE: This course aligns with the PLTW Introduction to Engineering Design curriculum. Use of the PLTW curriculum may require additional training and membership in the PLTW network.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes	NOTE: Schools that have agreed to be part of the Project Lead the Way network must follow all training and data collection requirements.	
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12	

	● Standard Trade & Industrial: Drafting K-12
Rules 46-47	● Industrial Technology K-12 ● Standard Trade & Industrial: Engineering 9-12 ● Standard Trade & Industrial: Drafting 9-12 ● Occupational Specialist I, II or III: Drafting 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Engineering 9-12
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering ● Workplace Specialist: Engineering ● CTE: Trade & Industrial: Drafting & Computer Aided Design (CAD) ● Workplace Specialist: Drafting & Computer Aided Design (CAD)
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Engineering 5-12 ● Workplace Specialist: Engineering 9-12 ● CTE: Trade & Industrial Drafting & Computer Aided Design (CAD) 5-12 ● Workplace Specialist: Mechanical Drafting 9-12 ● Workplace Specialist: Architectural Drafting 9-12 ● Workplace Specialist: Architectural Engineering 9-12 ● CTE: Trade & Industrial: Architecture 5-12 ● Workplace Specialist: Architecture 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	DESN 101: Intro to Design Technology; DESN 113: 2D Computer-Aided Design
VU Course Alignment	DRAF 140: Introduction to CAD ▾
Four Yr. Course Alignment	USI - ENGR 121: Drafting & Annotation
Postsecondary Credential	VU - A.S. Product Design and Production (15.1306)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Intro to Design***
4802.D1.1	Exercise file management and printing/plotting practices.
4802.D1.2	Understand the role of various types of drawings as applied to the design process.
4802.D1.3	Research potential career fields in Design Technology and Engineering.
4802.D1.4	Effectively communicate spatial visualizations with appropriate choices of technical drawings.
4802.D1.5	Demonstrate appropriate application of drawing standards to technical sketches and working

	drawings.
4802.D1.6	Collaborate in a studio setting.
4802.D1.7	Demonstrate relevant safety practices when using tools and equipment as determined by task, materials, environment, and protective attire.
4802.D1.8	Apply corrective action(s) to eliminate hazards.
4802.D1.9	Explain the importance of design documentation.
4802.D1.10	Apply sketching and annotation skills to document work.
4802.D1.11	Produce working drawings using appropriate drawing styles and techniques.
4802.D1.12	Formulate unbiased research questions to collect information/data and apply investigative strategies.
4802.D1.13	Select resources that are appropriate for academic research and relevant to the identified problem.
4802.D1.14	Discuss historical and current events related to engineering and technology and analyze the impact on society.
4802.D1.15	Discuss the importance of ethics in engineering design.
4802.D1.16	Synthesize information collected during the research process.
Domain	***Design Process***
4802.D2.1	Describe the steps in the design process.
4802.D2.2	Generate a valid and justifiable problem.
4802.D2.3	Create a design brief by constructing a problem and design statement and identifying problem constraints.
4802.D2.4	Apply the steps of the design process as they are used to solve the problem.
4802.D2.5	Describe the iterative nature of the design loop.
4802.D2.6	Discuss how the design process impacts the outcome when designing solutions to problems.
4802.D2.7	Implement design briefs in the problem-solving process.
4802.D2.8	Collaborate on engineering projects by working in design teams to solve valid problems.
4802.D2.9	Examine a design (product) with respect to its quality and usability.
4802.D2.10	Assess and refine original design solutions based upon reflection, critique, practice, and research.
Domain	***2D Computer Aided Design***
4802.D3.1	Create and use a template drawing.
4802.D3.2	Manipulate advanced dimensioning variables.
4802.D3.3	Use advanced editing commands.
4802.D3.4	Create blocks and form a symbol library.
4802.D3.5	Assign data/attributes to blocks.
4802.D3.6	Apply section lines to various types of drawing parts.
4802.D3.7	Create drawings using an isometric approach.
4802.D3.8	Share data utilizing external references.
4802.D3.9	Set up a plotter and plot a drawing.
Domain	***Additional Technical Drawing***
4802.D4.1	Distinguish between line types utilized on a technical drawing per industry standard (ANSI Line Conventions and Lettering Y14.2M-2008).
4802.D4.2	Interpret and develop appropriate annotations for technical drawings.
4802.D4.3	Differentiate between the various types of tolerances.
4802.D4.4	Analyze types of fits in relation to mating parts.

4802.D4.5	Collect and display data related to the sizes and shapes of objects utilizing various measuring tools.
4802.D4.6	Determine the appropriate number of views, including alternate views (auxiliary, section, detail), to fully document the details of a design.
4802.D4.7	Identify and produce various pictorial drawings including isometric, oblique, and perspective drawings for technical drawing representations.
4802.D4.8	Differentiate when the physical properties of geometric shapes can be utilized in order to optimize design solutions.
4802.D4.9	Apply industry accepted dimensioning practices to technical drawings to annotate design features.
4802.D4.10	Identify and produce multi-view drawings in proper orientation, scale, and proportion through methods of orthographic projection.
4802.D4.11	Illustrate and calculate mathematical problems related to real world situations involving characteristics of geometric shapes and solids.
Domain	***Reverse Engineering***
4802.D5.1	Identify visual, functional, and structural properties of a product.
4802.D5.2	Differentiate between invention and innovation.
4802.D5.3	Describe the relationship between reverse engineering and product/system improvement.
4802.D5.4	Create an innovation to a system or product using information obtained from a product analysis.
4802.D5.5	Evaluate the effectiveness of elements and principles in other design solutions and use analysis to revise original design.
4802.D5.6	Perform mathematical calculations to identify structural properties of a product.
Domain	***Modeling***
4802.D6.1	Formulate methods of communicating designs using various forms of modeling such as conceptual, graphical, mathematical, physical or computer modeling.
4802.D6.2	Utilize appropriate modeling materials to construct a physical model such as a prototype or mock-up.
4802.D6.3	Interpret the details of a sketch and generate physical or computer models using appropriate modeling materials and techniques.
4802.D6.4	Recognize and utilize constraints such as dimensional, geometric, assembly and parametric constraints in regard to modeling.
4802.D6.5	Identify the six degrees of freedom of a component floating in space in the context of an assembly.
4802.D6.6	Differentiate between assemblies and subassemblies and their appropriate use.
4802.D6.7	Use engineering design equipment (3D modeling software, 3D printer, etc.) to create 3D and 2D models to document engineering design. (Move to modeling)
4802.D6.8	Analyze the remaining degrees of freedom of mating components after systematically applying assembly constraints until only desired components are allowed to move.
4802.D6.9	Apply visual design principles to enhance the aesthetic appeal of a design solution.
4802.D6.10	Analyze products or systems by identifying problematic features to generate potential solution(s).
Domain	***Career Navigation***
4802.D7.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.

4802.D7.2	Understand the specialized skills needed for different career opportunities related to the program of study.
4802.D7.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
4802.D7.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
4802.D8.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
4802.D8.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
4802.D8.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
4802.D8.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
4802.D9.1	Demonstrate computer literacy skills and basic computer functions.
4802.D9.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
4802.D9.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
4802.D9.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Electronic Fundamentals	
Career Cluster	Advanced Manufacturing
Program of Study	Electronics and Computer Technology
NLPS Sequence	B
Course Code	7361
Course Description	*Electronic Fundamentals will concentrate on the physical world of electricity and electronics. Practical techniques for proper and safe use of basic hand and machine tools are introduced. Techniques for connecting various types of circuits are also covered. The process of fabricating printed circuit boards is presented.*
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas
Dual Credit Status	X
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Electronics Technology K-12	
Rules 46-47	● Standard Trade & Industrial: Electronics Technology 9-12 ● Occupational Specialist I, II or III: Electronics Technology or Industrial Electronics 9-12 ● Industrial Technology K-12	
Rules 2002	● CTE: Trade & Industrial: Electronics Technology ● Workplace Specialist: Electronics Technology or Industrial Electronics ● Technology Education	
REPA/REPA 3	● CTE: Trade & Industrial Electronics Technology 5-12 ● Workplace Specialist: Electronics Technology or Industrial Electronics 9- 12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	EECT 101: Introduction to Electronics and Projects	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	CT Automation Controls (15.0406); AAS Electronics and Computer Technology (15.0399)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Electronics***	
7361.D1.1	Practice principles of lab safety and electrical wiring safety and environmental impact awareness.	
7361.D1.2	Discuss basic power supply regulation.	
7361.D1.3	Create acceptable solder joints and desolder electronic components.	
7361.D1.4	Demonstrate the principles of using test equipment to assemble and test on electronics projects.	
7361.D1.5	Use proper assembly procedures for through-hole and surface mount parts.	
7361.D1.6	Describe basic procedures for IC fabrication.	
7361.D1.7	Apply basic project planning principles to a class project.	
7361.D1.8	Develop a plan of study for their degree.	

7361.D1.9	Outline careers and topics in electronics.

Digital Electronics		
Career Cluster	Advanced Manufacturing	
Program of Study	Engineering; Electronics and Computer Technology	
NLPS Sequence	C	
Course Code	5538	
Course Description	*Digital Electronics is a course of study in applied digital logic that encompasses the design and application of electronic circuits and devices found in video games, watches, calculators, digital cameras, and thousands of other devices. Instruction includes the application of engineering and scientific principles as well as the use of Boolean algebra to solve design problems. Using computer software that reflects current industry standards, activities should provide opportunities for students to design, construct, test, and analyze simple and complex digital circuitry software will be used to develop and evaluate the product design. This course engages students in critical thinking and problem-solving skills, time management and teamwork skills.* *NOTE: This course aligns with the PLTW Digital Electronics curriculum. Use of the PLTW curriculum may require additional training and membership in the PLTW network.*	
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Qualifies as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit under new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Engineering 9-12 ● Occupational Specialist I, II or III: Digital Electronics Technology ● Occupational Specialist I, II or III: Electronics Technology 9-12 or Industrial Electronics 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering ● Workplace Specialist: Digital Electronics Technology ● Workplace Specialist: Electronics Technology 9-12 or Industrial Electronics 9-12	

REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Engineering 5-12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Electronics Technology 9-12 or Industrial Electronics 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	EECT 112: Digital Fundamentals
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	Associate Certified Electronics Technician (CETa)
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Lab and Electrical Wiring Safety***
5538.D1.1	Students apply concepts of lab and electrical wiring safety to ensure a safe work environment.
5538.D1.2	Demonstrate wearing safety attire and following all classroom procedures related to safety.
5538.D1.3	Demonstrate methods to avoid electric shock by identifying the causes.
5538.D1.4	Utilizing environmentally sustainable design principles, design electronic circuits that reduce the negative impact on the environment while maintaining functions and safety.
5538.D1.5	Students will establish a working and functional knowledge of the software and equipment used in designing and troubleshooting circuits.
5538.D1.6	Create and test circuits using circuit design software.
5538.D1.7	Determine values associated with resistance, voltage, current and continuity using a digital multimeter.
5538.D1.8	Demonstrate successful soldering and desoldering techniques.
5538.D1.9	Demonstrate breadboarding techniques to build a working circuit.
Domain	***Basic Laws of Electricity***
5538.D2.1	Distinguish the parts of the atomic structure and how it plays a part in determining what elements are good conductors, insulators, and semi-conductors.
5538.D2.2	Define and explain Alternating Current (AC) and Direct Current (DC).
5538.D2.3	Distinguish between conventional current flow versus electron current flow and how they apply to engineering and scientific disciplines.
5538.D2.4	Design circuit boards that demonstrate the theory and principles associated with that of a complex circuit.

5538.D2.5	Calculate resistance, current and voltage in simple series, parallel and complex circuits using Ohm's Law.
5538.D2.6	Demonstrate the use of Kirchhoff's Voltage Law applied to simple series and complex circuits.
5538.D2.7	Demonstrate the use of Kirchhoff's Current Law for simple parallel and complex series-parallel circuits.
Domain	***Electrical Components***
5538.D3.1	Students apply concepts of the basic electrical components to design and create circuits.
5538.D3.2	Identify resistors by determining their nominal value.
5538.D3.3	Describe the material makeup of resistors and their application to circuit design.
5538.D3.4	Recognize industry standard symbols associated with resistors and their operation in schematic design.
5538.D3.5	Compare and contrast the measured value of a resistor to the calculated tolerance.
5538.D3.6	Identify the component parts of a capacitor, the types of capacitors available, ability to capture and contain static charge and voltage polarity requirements.
5538.D3.7	Identify and describe the unit of measure for capacitors.
5538.D3.8	Calculate the nominal values of different capacitors and their voltage polarity requirements.
5538.D3.9	Investigate types, functions, and power requirements of integrated circuits (logic gates).
5538.D3.10	Demonstrate the differences between an analog and cathode seven segment display.
Domain	***AC/DC Current Waveform***
5538.D4.1	Students analyze the characteristics of waveforms and voltage generation associated with AC and DC current.
5538.D4.2	Identify the anatomy of the waveform associated with AC and DC current.
5538.D4.3	Analyze both analog and digital waveforms
5538.D4.4	Differentiate between digital and analog signals when given a waveform.
5538.D4.5	Design, create and test circuits to calculate the output frequency of circuits using observations and the oscilloscope.
5538.D4.6	Calculate the duty cycle associated with a digital waveform using observations and the oscilloscope.
Domain	***Sequential Logic (Flip-Flops)***
5538.D5.1	Students create, analyze, and simplify digital logic circuits utilizing combinational and sequential logic.
5538.D5.2	Examine how to operate a circuit using sequential logic.
5538.D5.3	Compare and contrast between the different kinds of flip-flops.
5538.D5.4	Construct circuits and evaluate information about the various applications of flip- flops.
5538.D5.5	Demonstrate the differences associated with asynchronous and synchronous circuits.
5538.D5.6	Compare and evaluate how sequential logic determines the operation of a circuit waveform and how a truth table can be used to predict an outcome.
5538.D5.7	Use of flip-flops or latches to store data, act as a memory device or transfer data through a shift register.

5538.D5.8	Determine the proper selection and use of a small-scale integrated circuit (SSI) and medium scale integrated circuit (MSI).
Domain	***Number Systems, Simplifying***
5538.D6.1	Students convert and calculate number systems and sequences to simplify problems.
5538.D6.2	Convert numbers between the binary, hexadecimal, octal and decimal number systems.
5538.D6.3	Translate design specifications into truth tables using binary numbering system language.
5538.D6.4	Construct truth tables from logic expressions and vice versa.
5538.D6.5	Understand least significant bit and most significant bit numerical place value within a numbering system.
5538.D6.6	Use mathematical symbols to represent bases and communicate concepts using different number systems.
5538.D6.7	Demonstrate the relationship of binary and hexadecimal to bits and bytes of information used in computers.
5538.D6.8	Design, construct, and test adder circuits using both discrete and MSI gates to perform basic addition and subtraction using a binary numbering system.
5538.D6.9	Convert any number using appropriate SI unit prefixes.
Domain	***Programmable Logic Devices, State Machines, and Microprocessors***
5538.D7.1	Students design and create a microprocessor to understand the impact of design, creation, and implementation of a processor.
5538.D7.2	Understand how programmable logic devices (PLDs) are used to build and execute the operation of a circuit.
5538.D7.3	Develop an understanding of a state bubble and state diagram.
5538.D7.4	Construct a state transition table and derive equations for outputs at each state.
5538.D7.5	Construct a state machine circuit using multiple inputs and outputs.
5538.D7.6	Formulate a flowchart/pseudocode to correctly apply basic programming concepts in the planning of a project.
5538.D7.7	Execute a program using a microprocessor.

Electronics and Computer Technology Capstone	
Career Cluster	Advanced Manufacturing
Program of Study	Electronics and Computer Technology
NLPS Sequence	D
Course Code	7362
Course Description	*Electronics and Computer Technology Capstone provides the opportunity for students to continue with foundational electronic concepts including circuit analysis and digital electronics modules. This course incorporates classroom, laboratory, and work-based experiences in the fundamental electronics concepts of circuit analysis and digital electronics as well as optional modules focused on industrial technology, emerging electronic*

	technologies, residential and commercial electronic communication, and automation. Industry certifications and additional post-secondary education are critical components of this pathway.
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design; Electronic Fundamentals; Digital Electronics
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas
Dual Credit Status	X
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level II
Bulletin 400	● Standard Trade & Industrial: Electronics Technology K-12
Rules 46-47	● Standard Trade & Industrial: Electronics Technology 9-12 ● Occupational Specialist I, II or III: Electronics Technology or Industrial Electronics 9-12 ● Industrial Technology K-12
Rules 2002	● CTE: Trade & Industrial: Electronics Technology ● Workplace Specialist: Electronics Technology or Industrial Electronics ● Technology Education
REPA/REPA 3	● CTE: Trade & Industrial Electronics Technology 5-12 ● Workplace Specialist: Electronics Technology or Industrial Electronics 9- 12 ● Technology Education 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	INDT 205: Programmable Contollerss I or EECT 209: Industrial Computers I*; INDT 206: Programmable Controllers II* or EECT 210: Industrial Computers II*; EECT 128: Introduction to C Programming*
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT Automation Controls (15.0406); AAS Electronics and Computer Technology (15.0399)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Programming Automation Controls***

7362.D1.1	Review basic computer operations. Describe logic circuits and program from relay logic to ladder logic diagrams. Describe the common parts of programmable controllers.
7362.D1.2	Program a start/stop circuit using a PLC and design PLC programs using logical operators.
7362.D1.4	Program counters and timers using a programmable controller.
7362.D1.5	Install and troubleshoot a simple programmable controller system.
7362.D1.6	Develop Sequencers and execute basic troubleshooting.
7362.D1.7	Demonstrate ability to read and interpret technical documents. Demonstrate ability to use various types of software applicable to course.
7362.D1.8	Design and development of PLC programs using MCR (Master Control Reset), JMP and subroutines. Design and development of PLC programs using MATH & COMPARE instructions.
7362.D1.9	Develop PLC programs using Sequencers / Sequence logic. Demonstrate an ability to troubleshoot PLC controlled equipment. Design & configure analog signals to/from the PLC.
7362.D1.10	Demonstrate ability to read and interpret technical documents. Demonstrate ability to use various types of software applicable to course.
7362.D2.12	Design/develop and install basic HMI programs.
7362.D2.13	Recall fundamental content to meet/exceed the cut-score for the SACA (Smart Automation Certification Alliance) SACA C-207 Programmable Controller Systems 1- Silver Certification.
7362.D2.14	Demonstrate skills to obtain the SACA C-207 Programmable Controller Systems 1 - Gold Certification at a 100% of skill standard.
Domain	***"C" Programming***
7362.D2.1	Explain the purpose and principles of object-oriented and modular software design techniques.
7362.D2.2	Demonstrate step-by-step solutions to problems using correct problem-solving technique.
7362.D2.3	Write, compile, and debug C programs. Correctly use C variables and constants. Write interactive programs using Windows input and output methods.
7362.D2.4	Use mathematical and I/O library functions.
7362.D2.5	Use decision constructs such as if and switch/case statements.
7362.D2.6	Use looping constructs such as while and for.
7362.D2.7	Implement data in arrays.
Domain	***Industrial Computer Controls***
7362.D3.1	Identify the functional components of a digital control system and write a flowchart of a digital industrial control system.
7362.D3.2	Identify the components of a digital AC control system. Write and develop a program for an AC control system.
7362.D3.3	Define PLC using the NEMA definition of a PLC. Compare and demonstrate open loop feedback using a PC or a PLC.
7362.D3.4	Identify an assortment of input and output modules (digital and analog).
7362.D3.5	Troubleshoot by using built-in software diagnostics (edit the PLC and demonstrate the operation of several software functions). Troubleshoot by using standard hardware testing methods (multimeters and Scopes).

7362.D3.6	Write software programs using standard ladder logic.
7362.D3.7	Program a PLC to solve a variety of application problems, diagnose problems placed by the instructor in PLC-based control applications, and assemble a basic PLC system from modular components.
7362.D3.8	Build a process control system using a standard PC.
7362.D3.9	Identify the components of an industrial networking system. Interpret and create basic ladder logic coding.
7362.D3.10	Select and use subroutines and jump instructions appropriately. Select and use data manipulation, math, logic, and transfer instructions appropriately.
7362.D3.11	Differentiate between analog and digital techniques.
7362.D3.12	Develop a Panel view program (Factory talk view Studio).
7362.D3.13	Translate numerical values between several binary code systems.
7362.D3.14	Specify and select appropriate input / output modules to include analog.
7362.D3.15	Install a programmable logic controller workstation using panel view.
7362.D3.16	Interface PLC technology to AC Controls and DC controls. Network PLC systems to develop an integrated system. Debug PLC Systems.
7362.D3.17	Solve application using process control.
7362.D3.18	Integrate programmable control devices with electromechanical control devices and analyze and diagnose systems involving programmable controllers to determine fault areas.

Semiconductor Fabrication Capstone	
Career Cluster	Advanced Manufacturing
Program of Study	Electronics and Computer Technology
NLPS Sequence	D
Course Code	7098
Course Description	The semiconductor fabrication capstone provides students with an opportunity to delve into the burgeoning semiconductor manufacturing industry. Students will be challenged to identify, understand, and apply core concepts to semiconductor manufacturing. Topics such as microelectromechanical systems and vacuum technology in manufacturing will be discussed. Emphasis will also be placed on specific operating and safety procedures which the fabrication of semiconductors requires.
Prereq(s)/Co-Req(s)	Introduction to Engineering Design; Electronic Fundamentals; Digital Electronics
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	
Dual Credit Status	

Additional Notes	Counts as a quantitative reasoning course	
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Electronics Technology K-12 ● Standard Trade & Industrial: Engineering K-12 ● Standard Trade & Industrial: Drafting K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Electronics Technology 9-12 ● Standard Trade & Industrial: Drafting 9-12 ● Standard Trade & Industrial: Engineering 9-12 ● Occupational Specialist I, II or III: Electronics Technology or Industrial Electronics 9-12 ● Occupational Specialist I, II, or III: Drafting 9-12 ● Occupational Specialist I, II, or III: Engineering 9-12	
Rules 2002	● CTE: Trade & Industrial: Electronics Technology ● CTE: Trade & Industrial: Engineering ● CTE: Trade & Industrial: Drafting & Computer Aided Design (CAD) ● Workplace Specialist: Electronics Technology or Industrial Electronics ● Workplace Specialist: Drafting & Computer Aided Design (CAD) ● Technology Education with high school setting	
REPA/REPA 3	● CTE: Trade & Industrial: Electronics Technology 5-12 ● CTE: Trade & Industrial: Engineering 5-12 ● CTE: Trade & Industrial: Drafting & Computer Aided Design (CAD) ● Workplace Specialist: Electronics Technology or Industrial Electronics 9- 12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Mechanical Drafting 9-12 ● Workplace Specialist: Architectural Engineering 9-12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC – CT – Semiconductor Fabrication ITCC – TC – Electronics and Computing Technology	
Liberal Arts/Sciences Requirements		
Promoted Certifications		

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Microsystems Introduction***
7098.D1.1	Explain historical perspective of Microelectromechanical Systems (MEMS) development and key milestones.
7098.D1.2	Outline current and future application trends and commercialization.
7098.D1.3	Evaluate terminology used in this broad field.
7098.D1.4	Summarize micro sensors and transducers.
7098.D1.5	Experiment with basic MEMS processes such as LIGA, Bulk, and Surface Micromachining.
7098.D1.6	Make use of web based MEMS research.
7098.D1.7	Define microsystems design concepts.
Domain	***Vacuum Technology Introduction***
7098.D2.1	Recognize Vacuum Technology
7098.D2.2	Identify the Behavior of Gases
7098.D2.3	Identify Vacuum Systems
7098.D2.4	Apply Rough Vacuum Regime
7098.D2.5	Understand High Vacuum Regime
7098.D2.6	Analyze Partial Pressure Analysis Using Residual Gas Analyzer
7098.D2.7	Recognize Leak Detection in Vacuum Systems
7098.D2.8	Apply Gas Delivery and Pressure Control
7098.D2.9	Practice Safety Issues in Vacuum Systems
Domain	***Characterizations of Microsystems***
7098.D3.1	Analyze, construct and troubleshoot various device models for electrical and mechanical systems.
7098.D3.2	Understand how to verify and validate a device model.
7098.D3.3	Compare different test circuits for device models.
7098.D3.4	Describe device models for diodes, transistors, FETs and MOSFETs.
7098.D3.5	Develop behavioral models for mechanical devices.
7098.D3.6	Build, simulate and troubleshoot device models for semiconductors.
7098.D3.7	Demonstrate knowledge of resistance, inductance and capacitance variability.
7098.D3.8	Describe how purchase and temperature include variability in part performance.
Domain	***Electronics & Microsystems***
7098.D4.1	Understand history of microsystems sensors, transducers, and actuators.
7098.D4.2	Describe how microsystems work.
7098.D4.3	Understand the uniqueness of the micro-scale.
7098.D4.4	Describe sensors and how they are built.
7098.D4.5	Know microfabrication processes.

7098.D4.6	Understand how noise impacts circuit performance.
7098.D4.7	Analyze circuit designs used to amplify sensor signals.
7098.D4.8	Test microsystem models and devices to better understand functionality.

Advanced Manufacturing Engineering							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
4802	Introduction to Engineering Design	5644	Principles of Engineering	5538	Digital Electronics	5698	Engineering Design and Development
				5650	Civil Engineering and Architecture		
				5518	Aerospace Engineering		
				5534	Computer Integrated Manufacturing		
				4818	Environmental Sustainability		

Introduction to Engineering Design	
Career Cluster	Advanced Manufacturing
Program of Study	Design Technology, Electronics and Computer Technology, Engineering
NLPS Sequence	A
Course Code	4802
Course Description	*Introduction to Engineering Design is a fundamental pre-engineering course where students become familiar with the engineering design process. Students work both individually and in teams to design solutions to a variety of problems using industry standard sketches and current 3D design and modeling software to represent and communicate solutions. Students apply their knowledge through hands-on projects and document their work with the use of an engineering notebook. Students begin with completing structured activities and move to solving open-ended projects and problems that require them to develop planning, documentation, communication, and other professional skills. Ethical issues related to professional practice and product development are also presented.* ***NOTE:*** *This course aligns with the PLTW Introduction to Engineering Design curriculum. Use of the PLTW curriculum may require additional training and membership in the PLTW network.*
Prerequisite(s)/ Corequisite(s)	None
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)

Additional Notes	NOTE: Schools that have agreed to be part of the Project Lead the Way network must follow all training and data collection requirements.	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12 ● Standard Trade & Industrial: Drafting K-12	
Rules 46-47	● Industrial Technology K-12 ● Standard Trade & Industrial: Engineering 9-12 ● Standard Trade & Industrial: Drafting 9-12 ● Occupational Specialist I, II or III: Drafting 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Engineering 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering ● Workplace Specialist: Engineering ● CTE: Trade & Industrial: Drafting & Computer Aided Design (CAD) ● Workplace Specialist: Drafting & Computer Aided Design (CAD)	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Engineering 5-12 ● Workplace Specialist: Engineering 9-12 ● CTE: Trade & Industrial Drafting & Computer Aided Design (CAD) 5-12 ● Workplace Specialist: Mechanical Drafting 9-12 ● Workplace Specialist: Architectural Drafting 9-12 ● Workplace Specialist: Architectural Engineering 9-12 ● CTE: Trade & Industrial: Architecture 5-12 ● Workplace Specialist: Architecture 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	DESN 101: Intro to Design Technology; DESN 113: 2D Computer-Aided Design	
VU Course Alignment	DRAF 140: Introduction to CAD ▾	
Four Yr. Course Alignment	USI - ENGR 121: Drafting & Annotation	
Postsecondary Credential	VU - A.S. Product Design and Production (15.1306)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		

Competency #	Competency
Domain	***Introduction to Design***
4802.D1.1	Exercise file management and printing/plotting practices.
4802.D1.2	Understand the role of various types of drawings as applied to the design process.
4802.D1.3	Research potential career fields in Design Technology and Engineering.
4802.D1.4	Effectively communicate spatial visualizations with appropriate choices of technical drawings.
4802.D1.5	Demonstrate appropriate application of drawing standards to technical sketches and working drawings.
4802.D1.6	Collaborate in a studio setting.
4802.D1.7	Demonstrate relevant safety practices when using tools and equipment as determined by task, materials, environment, and protective attire.
4802.D1.8	Apply corrective action(s) to eliminate hazards.
4802.D1.9	Explain the importance of design documentation.
4802.D1.10	Apply sketching and annotation skills to document work.
4802.D1.11	Produce working drawings using appropriate drawing styles and techniques.
4802.D1.12	Formulate unbiased research questions to collect information/data and apply investigative strategies.
4802.D1.13	Select resources that are appropriate for academic research and relevant to the identified problem.
4802.D1.14	Discuss historical and current events related to engineering and technology and analyze the impact on society.
4802.D1.15	Discuss the importance of ethics in engineering design.
4802.D1.16	Synthesize information collected during the research process.
Domain	***Design Process***
4802.D2.1	Describe the steps in the design process.
4802.D2.2	Generate a valid and justifiable problem.
4802.D2.3	Create a design brief by constructing a problem and design statement and identifying problem constraints.
4802.D2.4	Apply the steps of the design process as they are used to solve the problem.
4802.D2.5	Describe the iterative nature of the design loop.
4802.D2.6	Discuss how the design process impacts the outcome when designing solutions to problems.
4802.D2.7	Implement design briefs in the problem-solving process.
4802.D2.8	Collaborate on engineering projects by working in design teams to solve valid problems.
4802.D2.9	Examine a design (product) with respect to its quality and usability.
4802.D2.10	Assess and refine original design solutions based upon reflection, critique, practice, and research.
Domain	***2D Computer Aided Design***
4802.D3.1	Create and use a template drawing.
4802.D3.2	Manipulate advanced dimensioning variables.
4802.D3.3	Use advanced editing commands.
4802.D3.4	Create blocks and form a symbol library.
4802.D3.5	Assign data/attributes to blocks.
4802.D3.6	Apply section lines to various types of drawing parts.
4802.D3.7	Create drawings using an isometric approach.
4802.D3.8	Share data utilizing external references.

4802.D3.9	Set up a plotter and plot a drawing.
Domain	***Additional Technical Drawing***
4802.D4.1	Distinguish between line types utilized on a technical drawing per industry standard (ANSI Line Conventions and Lettering Y14.2M-2008).
4802.D4.2	Interpret and develop appropriate annotations for technical drawings.
4802.D4.3	Differentiate between the various types of tolerances.
4802.D4.4	Analyze types of fits in relation to mating parts.
4802.D4.5	Collect and display data related to the sizes and shapes of objects utilizing various measuring tools.
4802.D4.6	Determine the appropriate number of views, including alternate views (auxiliary, section, detail), to fully document the details of a design.
4802.D4.7	Identify and produce various pictorial drawings including isometric, oblique, and perspective drawings for technical drawing representations.
4802.D4.8	Differentiate when the physical properties of geometric shapes can be utilized in order to optimize design solutions.
4802.D4.9	Apply industry accepted dimensioning practices to technical drawings to annotate design features.
4802.D4.10	Identify and produce multi-view drawings in proper orientation, scale, and proportion through methods of orthographic projection.
4802.D4.11	Illustrate and calculate mathematical problems related to real world situations involving characteristics of geometric shapes and solids.
Domain	***Reverse Engineering***
4802.D5.1	Identify visual, functional, and structural properties of a product.
4802.D5.2	Differentiate between invention and innovation.
4802.D5.3	Describe the relationship between reverse engineering and product/system improvement.
4802.D5.4	Create an innovation to a system or product using information obtained from a product analysis.
4802.D5.5	Evaluate the effectiveness of elements and principles in other design solutions and use analysis to revise original design.
4802.D5.6	Perform mathematical calculations to identify structural properties of a product.
Domain	***Modeling***
4802.D6.1	Formulate methods of communicating designs using various forms of modeling such as conceptual, graphical, mathematical, physical or computer modeling.
4802.D6.2	Utilize appropriate modeling materials to construct a physical model such as a prototype or mock-up.
4802.D6.3	Interpret the details of a sketch and generate physical or computer models using appropriate modeling materials and techniques.
4802.D6.4	Recognize and utilize constraints such as dimensional, geometric, assembly and parametric constraints in regard to modeling.
4802.D6.5	Identify the six degrees of freedom of a component floating in space in the context of an assembly.
4802.D6.6	Differentiate between assemblies and subassemblies and their appropriate use.
4802.D6.7	Use engineering design equipment (3D modeling software, 3D printer, etc.) to create 3D and 2D models to document engineering design. (Move to modeling)
4802.D6.8	Analyze the remaining degrees of freedom of mating components after systematically applying

	assembly constraints until only desired components are allowed to move.
4802.D6.9	Apply visual design principles to enhance the aesthetic appeal of a design solution.
4802.D6.10	Analyze products or systems by identifying problematic features to generate potential solution(s).
Domain	***Career Navigation***
4802.D7.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
4802.D7.2	Understand the specialized skills needed for different career opportunities related to the program of study.
4802.D7.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
4802.D7.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
4802.D8.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
4802.D8.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
4802.D8.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
4802.D8.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
4802.D9.1	Demonstrate computer literacy skills and basic computer functions.
4802.D9.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
4802.D9.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
4802.D9.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Principles of Engineering	
Career Cluster	Advanced Manufacturing
Program of Study	Engineering
NLPS Sequence	B
Course Code	5644
Course Description	*Principles of Engineering is a course that focuses on the process of applying engineering, technological, scientific and mathematical principles in the design, production, and operation of products, structures, and systems. This is a hands-on course designed to provide students interested in engineering careers to explore experiences related to specialized fields such as civil, mechanical, and materials engineering. Students will engage in research, development, planning, design, production, and project management to simulate a career in engineering.*

	The topics of ethics and the impacts of engineering decisions are also addressed. Classroom activities are organized to allow students to work in teams and use modern technological processes, computers, CAD software, and production systems in developing and presenting solutions to engineering problems. Schools may use the PLTW curriculum to meet the standards for this course. ***NOTE:** This course aligns with the PLTW Principles of Engineering curriculum. Use of the PLTW curriculum may require additional training and membership in the PLTW network.*	
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a science course requirement for CORE 40 diplomas Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12	
Rules 46-47	● Industrial Technology K-12 ● Standard Trade & Industrial: Engineering 9-12 ● Occupational Specialist I, II or III: Engineering	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering ● Workplace Specialist: Engineering	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Engineering 5-12 ● Workplace Specialist: Engineering 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	DESN 104: Mechanical Graphics	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted		

Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Project Management***
5644.D1.1	Students will exhibit appropriate safety practices while working with tools and equipment.
5644.D1.2	Demonstrate relevant safety practices when using tools and equipment as determined by task, materials, environment, and protective attire.
5644.D1.3	Apply corrective action(s) to eliminate hazards.
5644.D1.4	Understand the format and content of industry-based Material Safety Data Sheets (MSDS).
5644.D1.5	Students will investigate various careers within the fields of engineering and technology.
5644.D1.6	Identify engineering and technology occupations and the roles and responsibilities of each.
5644.D1.7	Report job outlook, demand, and projected wages for engineering and technology careers.
5644.D1.8	Explore job opportunities that are available in engineering and technology.
5644.D1.9	Investigate post-secondary training opportunities and industry certifications that are available.
5644.D1.10	Explore professional organizations related to engineering and technology.
5644.D1.11	Students will communicate the design process.
5644.D1.12	Explain the importance of documentation.
5644.D1.13	Apply sketching and annotation skills to document work.
5644.D1.14	Produce working drawings using appropriate drawing styles and techniques.
5644.D1.15	Construct design models or finish models to display concepts of design or theory investigated.
5644.D1.16	Document project components into an engineering notebook (digital or paper).
5644.D1.17	Communicate technical knowledge in a variety of formats.
5644.D1.18	Utilize presentation software to create a presentation that outlines team or individual priorities for design and share with peers.
5644.D1.19	Document best work in a portfolio (digital or paper).
5644.D1.20	Students will apply appropriate research techniques.
5644.D1.21	Formulate unbiased research questions to collect information/data.
5644.D1.22	Apply appropriate investigative strategies.
5644.D1.23	Evaluate sources appropriate for academic research.
5644.D1.24	Select resources relevant to the identified problem.
5644.D1.25	Synthesize information collected during the research process.
5644.D1.26	Generate a list of sources used to gather information using APA or MLA format.
Domain	***Design and Documentation***
5644.D2.1	Students will create solutions utilizing the design process.
5644.D2.2	Describe the steps in the design process.
5644.D2.3	Create a decision-making matrix for design problems.
5644.D2.4	Select an approach that meets or satisfies the constraints provided in a design brief.

5644.D2.5	Assess and refine original design solutions based upon reflection, critique, practice, and research.
5644.D2.6	Collaborate with team members to develop a design solution.
Domain	***Energy and Power***
5644.D3.1	Students adapt and apply energy and power concepts to develop an efficient system.
5644.D3.2	Categorize energy sources.
5644.D3.3	Analyze energy source processes.
5644.D3.4	Determine systems efficiency and energy use.
5644.D3.5	Identify and describe the possible types of power conversion.
5644.D3.6	Assess energy sources that can be combined to convert energy to useful forms.
5644.D3.7	Calculate circuit resistance, current, and voltage using Ohm's law.
5644.D3.8	Compare the advantages and disadvantages of parallel and series circuit design.
5644.D3.9	Analyze the relationships between voltage, current, and resistance.
5644.D3.10	Explore ways to produce mechanical power using alternative energy.
Domain	***Statics***
5644.D4.1	Students interpret science and math concepts to determine the effect of stresses placed on a structure and its components.
5644.D4.2	Classify different structural elements of a system.
5644.D4.3	Analyze forces acting upon an object in each situation.
5644.D4.4	Calculate the centroid location of simple and complex shapes.
5644.D4.5	Illustrate the moment of inertia of structural members.
5644.D4.6	Differentiate between scalar and vector.
5644.D4.7	Demonstrate appropriate scalar and vector calculations.
5644.D4.8	Calculate unknown forces using equations of equilibrium.
5644.D4.9	Determine forces acting on an object using the method of joints strategy.
Domain	***Material Properties, Testing, and Structural Analysis***
5644.D5.1	Students synthesize results of tested materials and structures to determine fitness of use.
5644.D5.2	Verify non-destructive/destructive material property tests on selected common products using measuring instruments, investigation methods of discovery, and assembly/disassembly of material components.
5644.D5.3	Analyze material properties used to create products.
5644.D5.4	Execute testing procedures to justify calculations of product mass properties in relation to various material properties.
5644.D5.5	Identify and describe the manufacturing processes used to create common products.
5644.D5.6	Describe the lifecycle of materials.
5644.D5.7	Identify common recycling symbols of materials and codes that regulate recycling.
Domain	***Kinematics***
5644.D6.1	Students apply the laws of motion as they apply to principles of engineering.

5644.D6.2	Demonstrate the calculation of projectile motion given parameters.
5644.D6.3	Examine the propulsion of an object.
5644.D6.4	Explain how gravity impacts motion.
5644.D6.5	Apply the laws of motion to solutions.
5644.D6.6	Analyze the forces acting on an object while in motion.
5644.D6.7	Describe the relationships among force, mass, and direction.
Domain	***Simple Machines***
5644.D7.1	Students evaluate simple machines for the purpose of solving a wide range of design and application problems.
5644.D7.2	Apply the six simple machines (lever, wheel and axle, pulley, inclined plane, wedge, and screw), their attributes, and components.
5644.D7.3	Calculate mechanical advantage of different mechanisms.
5644.D7.4	Design, create, and test gear, pulley, and sprocket systems.
5644.D7.5	Calculate work and power in mechanical systems.
5644.D7.6	Determine efficiency in a mechanical system.
5644.D7.7	Measure forces and distances related to mechanisms.
Domain	***Statistics***
5644.D8.1	Students apply basic statistical principles as they apply to project solutions.
5644.D8.2	Compare theoretical and experimental data
5644.D8.3	Use statistics to determine theoretical outcomes.
5644.D8.4	Illustrate the use of statistics in the engineering design process.
5644.D8.5	Determine probability and graph data and outcomes using software.
Domain	***Hydraulics and Pneumatics***
5644.D9.1	Students assess hydraulic and pneumatic systems for the purpose of use as a control system component.
5644.D9.2	Distinguish between hydrodynamic and hydrostatic systems.
5644.D9.3	Calculate values in a fluid power system (pneumatic and hydraulic).
5644.D9.4	Distinguish between the laws of fluid power to calculate pressure, temperature, and volume.
5644.D9.5	Differentiate between the characteristics of pneumatic and hydraulic systems.
5644.D9.6	Identify and explain basic components and functions of fluid power devices.
Domain	***Control Systems***
5644.D10.1	Students apply concepts of computer programming, logic, and fluid power to establish an automated control system.
5644.D10.2	Create control systems using computer software that optimizes hardware functionality.
5644.D10.3	Choose appropriate input and output devices based on the need of a technological system.
5644.D10.4	Differentiate between the characteristics of digital and analog devices.
5644.D10.5	Determine the most appropriate open and closed loop systems to solve a given technological problem.
5644.D10.6	Describe applications of process control and automation systems.

5644.D10.7	Apply design concepts to problems in process control and automations systems.

Aerospace Engineering		
Career Cluster	Advanced Manufacturing	
Program of Study	Engineering	
NLPS Sequence	C	
Course Code	5518	
Course Description	*Aerospace Engineering should provide students with the fundamental knowledge and experience to apply mathematical, scientific, and engineering principles to the design, development, and evolution of aircraft, space vehicles and their operating systems. Emphasis should include investigation and research on flight characteristics, analysis of aerodynamic design, and impact of this technology on the environment. Classroom instruction should provide creative thinking and problem-solving activities using software that allows students to design, test, and evaluate a variety of air and space vehicles, their systems, and launching, guidance and control procedures.* ***NOTE:** This course aligns with the PLTW Aerospace Engineering curriculum. Use of the PLTW curriculum may require additional training and membership in the PLTW network.*	
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12	
Rules 46-47	● Industrial Technology K-12 ● Standard Trade & Industrial: Engineering 9-12 ● Occupational Specialist I, II or III: Engineering	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering ● Workplace Specialist: Engineering	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Engineering 5-12	

	● Workplace Specialist: Engineering 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Project Management***
5518.D1.1	Students will exhibit appropriate safety practices while working with tools and equipment.
5518.D1.2	Demonstrate relevant safety practices when using tools and equipment as determined by task, materials, environment, and protective attire.
5518.D1.3	Apply corrective action(s) to eliminate hazards.
5518.D1.4	Understand the format and content of industry-based Material Safety Data Sheets (MSDS).
5518.D1.5	Students will investigate various careers within the fields of engineering and technology.
5518.D1.6	Identify engineering and technology occupations and the roles and responsibilities of each.
5518.D1.7	Report job outlook, demand, and projected wages for engineering and technology careers.
5518.D1.8	Explore job opportunities that are available in engineering and technology.
5518.D1.9	Investigate post-secondary training opportunities and industry certifications that are available.
5518.D1.10	Explore student professional organizations related to engineering and technology.
5518.D1.11	Students will communicate the design process.
5518.D1.12	Explain the importance of documentation.
5518.D1.13	Apply sketching and annotation skills to document work.
5518.D1.14	Produce working drawings using appropriate drawing styles and techniques.
5518.D1.15	Construct design models or finish models to display concepts of design or theory investigated.
5518.D1.16	Document project components into an engineering notebook (digital or paper).
5518.D1.17	Communicate technical knowledge in a variety of formats.
5518.D1.18	Utilize presentation software to create a presentation that outlines team or individual priorities for design and share with peers.
5518.D1.19	Document best work in a portfolio (digital or paper).
5518.D1.20	Students will apply appropriate research techniques.
5518.D1.21	Formulate unbiased research questions to collect information/data.

5518.D1.22	Apply appropriate investigative strategies.
5518.D1.23	Evaluate sources appropriate for academic research.
5518.D1.24	Select resources relevant to the identified problem.
5518.D1.25	Synthesize information collected during the research process.
5518.D1.26	Generate a list of sources used to gather information using APA or MLA format.
Domain	***Basic Aerodynamics***
5518.D2.1	Students evaluate the design of an airfoil to analyze aerodynamic forces.
5518.D2.2	Calculate associated forces and atmospheric conditions that affect flight.
5518.D2.3	Identify the control surfaces of an aircraft and the impact of each on the axis of rotation and motion.
5518.D2.4	Utilize information from avionics systems to provide stable and controlled flight.
5518.D2.5	Hypothesize the flight characteristics of an aerospace surface based on test data.
5518.D2.6	Investigate the historical impact of the design of aerospace technologies.
5518.D2.7	Compare and contrast the various methods by which different aerospace technologies achieve and maintain stable flight.
Domain	***Aerospace Materials***
5518.D3.1	Students validate the selection of materials and processes to produce cost-effective and structurally sound aerospace products.
5518.D3.2	Describe how various material types are used.
5518.D3.3	Analyze the impact of stress on the different material types to infer the best application.
5518.D3.4	Differentiate between proper and improper structural shapes within specific aerospace applications.
5518.D3.5	Design, construct, and test alternative aerospace material.
5518.D3.6	Predict the future of aerospace materials and their impact on air and space travel
Domain	***Propulsion Systems***
5518.D4.1	Students evaluate differing methods of propulsion to verify the proper application given a specific aerospace need.
5518.D4.2	Differentiate between the various types of propulsion systems in terms of structure, operation, placement, and specific use.
5518.D4.3	Predict and explain the flight path taken by a suborbital rocket.
5518.D4.4	Connect propulsion systems to the four forces of flight.
Domain	***Avionics and Flight Systems***
Core Standard 4	Students apply and adapt navigation tools and skills to demonstrate the rules of flight planning and navigation.
ASE-4.1	Cite evidence for the development of different navigational techniques.
ASE-4.2	Plan a successful flight using modern (GPS) and traditional (VOR and “dead reckoning”) navigation aids.
ASE-4.3	Analyze the constraints that impact cost effective flight planning.
ASE-4.4	Assess the functionality of GPS in terms of accuracy and reliability.
Domain	***Space Travel***
5518.D5.1	Students investigate space systems to better understand the correlation between space travel and orbital mechanics.
5518.D5.2	Justify the regulation of the use of space.
5518.D5.3	Describe the history of space travel emphasizing the impact of the space race on society.
5518.D5.4	Utilize Kepler’s Laws to describe and predict the path of an orbiting satellite

Domain	***Aerospace Physiology***
5518.D6.1	Students understand the limitations of space travel due to human physiology.
5518.D6.2	Identify flight constraints based on the limitations of the human body.
5518.D6.3	Investigate human involvement in aerospace incidents.
5518.D6.4	Suggest modifications for flight control based upon structure and function of the human body.
5518.D6.5	Justify the use of unmanned aerial vehicles (UAVs) based on the limitations imposed on flight by humans.
5518.D6.6	Examine the effects of spaceflight on the human body.
5518.D6.7	Prescribe accommodations used during short-term and long-term space travel to maintain functioning body systems.
Domain	***Alternative Applications of Aerospace Engineering***
5518.D7.1	Students investigate non-flight applications of aerospace engineering concepts.
5518.D7.2	Correlate processes used in aerospace engineering design to profitability, cost effectiveness, and impact on the environment.
5518.D7.3	Develop a working system that can operate remotely and/or autonomously at a remote location.
5518.D7.4	Differentiate amongst the various control systems used in distant operations.
5518.D7.5	Determine the obstacles to delivering and operating a system at a remote location.
5518.D7.6	Justify the need for unmanned aerial and terrestrial vehicles for both military and civilian purposes.

Civil Engineering and Architecture	
Career Cluster	Advanced Manufacturing
Program of Study	Engineering
NLPS Sequence	C
Course Code	5650
Course Description	*Civil Engineering and Architecture introduces students to the fundamental design and development aspects of civil engineering and architectural planning activities. Application and design principles will be used in conjunction with mathematical and scientific knowledge. Computer software programs should allow students opportunities to design, simulate, and evaluate the construction of buildings and communities. During the planning and design phases, instructional emphasis should be placed on related transportation, water resource, and environmental issues. Activities should include the preparation of cost estimates as well as a review of regulatory procedures that would affect the project design.* ***NOTE:*** *This course aligns with the PLTW Civil Engineering and Architecture curriculum. Use of the PLTW Curriculum may require additional training and membership in the PLTW network.*
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas

	Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Civil-Architectural Engineering 9-12 ● Occupational Specialist I, II or III: Civil-Architectural Engineering 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Civil-Architectural Engineering Workplace Specialist: Civil-Architectural Engineering	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Civil-Architectural Engineering 5-12 ● Workplace Specialist: Engineering 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	DESN 105: Architectural Design I	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Project Management***	
5650.D1.1	Students will exhibit appropriate safety practices while working with tools and equipment.	
5650.D1.2	Demonstrate relevant safety practices when using tools and equipment as determined by task, materials, environment, and protective attire.	
5650.D1.3	Apply corrective action(s) to eliminate hazards.	

5650.D1.4	Understand the format and content of industry-based Material Safety Data Sheets (MSDS).
5650.D1.5	Students will investigate various careers within the fields of engineering and technology.
5650.D1.6	Identify engineering and technology occupations and the roles and responsibilities of each.
5650.D1.7	Report job outlook, demand, and projected wages for engineering and technology careers.
5650.D1.8	Explore job opportunities that are available in engineering and technology.
5650.D1.9	Investigate post-secondary training opportunities and industry certifications that are available.
5650.D1.10	Explore student professional organizations related to engineering and technology.
5650.D1.11	Students will communicate the design process.
5650.D1.12	Explain the importance of documentation.
5650.D1.13	Apply sketching and annotation skills to document work.
5650.D1.14	Produce working drawings using appropriate drawing styles and techniques.
5650.D1.15	Construct design models or finish models to display concepts of design or theory investigated.
5650.D1.16	Document project components into an engineering notebook (digital or paper).
5650.D1.17	Communicate technical knowledge in a variety of formats.
5650.D1.18	Utilize presentation software to create a presentation that outlines team or individual priorities for design and share with peers.
5650.D1.19	Document best work in a portfolio (digital or paper).
5650.D1.20	Students will apply appropriate research techniques.
5650.D1.21	Formulate unbiased research questions to collect information/data.
5650.D1.22	Apply appropriate investigative strategies.
5650.D1.23	Evaluate sources appropriate for academic research.
5650.D1.24	Select resources relevant to the identified problem.
5650.D1.25	Synthesize information collected during the research process.
5650.D1.26	Generate a list of sources used to gather information using APA or MLA format.
Domain	***History in Architecture and Civil Engineering***
5650.D2.1	Students evaluate historical structures to understand the evolution of design elements, structural components and material used.
5650.D2.2	Identify and describe multiple architectural styles that are major milestones in the design and development of structures.
5650.D2.3	Analyze the influence technology innovations have had on the design and construction of structures.
5650.D2.4	Identify advancements related to architectural design, engineering, and technological advancements through history and how those innovations have changed the way structures are designed.
5650.D2.5	Compare modern structural and architectural design to historical designs.
Domain	***Architectural Design, Cost & Efficiency***
5650.D3.1	Students assess architectural design to incorporate the use of spatial relationships, building layout, and costs into a design project.

5650.D3.2	Describe connections between architectural disciplines and engineering disciplines and their roles in the design and construction process.
5650.D3.3	Demonstrate the importance of focusing on detail when executing the design process.
5650.D3.4	Examine concepts related to the Principles of Design and Elements of Design.
5650.D3.5	Apply the steps of the design process to solve a variety of architectural design problems.
5650.D3.6	Demonstrate the use of math skills to calculate material costs associated with the construction of commercial and residential structures.
5650.D3.7	Demonstrate how to calculate basic heat loss/heat gain of a structure.
5650.D3.8	Identify and describe common materials used in the construction of a building or residential structure.
5650.D3.9	Identify and implement the use of Universal Design principles as part of a design solution.
5650.D3.10	Analyze and incorporate sustainable building practices into a design solution.
5650.D3.11	Interpret and use an engineering and architectural scale to measure and determine sizes of elements on a printed drawing.
5650.D3.12	Recognize and distinguish the basic types of floor plans styles associated with architectural design.
Domain	***Residential Building Design***
5650.D4.1	Students establish a base knowledge of residential design concepts to develop a set of construction documents.
5650.D4.2	Develop a program and scope document to identify a client's needs for a residential structure.
5650.D4.3	Apply basic design guidelines and practices for the development of private, public and services spaces within a residential structure.
5650.D4.4	Develop and document a plot plan or site plan for a residence considering drainage, property improvements, utilities, and dwelling footprint.
5650.D4.5	Design and document footings and foundations for a residential structure.
5650.D4.6	Design and document a residential floor plan using the accepted industry standards related to drawing scale, symbols, annotation and drawing techniques.
5650.D4.7	Design and document exterior and interior elevations.
5650.D4.8	Identify the appropriate materials to be used in residential construction in accordance with geographical location, building codes, and style of dwelling.
5650.D4.9	Analyze and apply building codes and zoning codes for use in constructing a residential structure.
5650.D4.10	Identify components of residential framing systems.
5650.D4.11	Determine the advantages and disadvantages between different residential roof designs per geographical location and client design requirements.
5650.D4.12	Analyze a residential structure to identify how the implementation of green architecture in the design and construction impacts the environment.
5650.D4.13	Utilize computer-aided design (CAD) software to develop design and construction documentation for a residential structure.
5650.D4.14	Design and document required details and sections associated with residential structures.

Domain	***Commercial Building Design***
5650.D5.1	Students establish a base knowledge to identify commercial building materials, building codes, and design concepts to develop a set of construction documents.
5650.D5.2	Identify and compare the similarities and the differences between commercial and residential building systems.
5650.D5.3	Identify and compare the similarities and the differences between residential and commercial design related to local, state, and national building codes.
5650.D5.4	Evaluate zoning regulations for the allowable use of property.
5650.D5.5	Identify the appropriate materials and their assembly to create a wall system for a commercial structure in accordance with geographical location, building codes, and style of the structure.
Domain	***Structural Components and Design***
5650.D6.1	Students connect through terminology and mathematics the structural components of commercial and residential design to apply loads on a structure including beams, girders, columns, and footings.
5650.D6.2	Determine the appropriate roof beams to carry the calculated load able to support the design load of a structure.
5650.D6.3	Determine the design load conditions for beams and girders within a structure.
5650.D6.4	Construct free body diagramming to demonstrate the structural analysis of supported beams.
5650.D6.5	Determine required floor loading of a structure and determine how it affects support elements within a structure.
5650.D6.6	Identity and select the proper commercial foundation systems by material and use of the system.
5650.D6.7	Determine and analyze design loads transferred from the structure to the ground.
5650.D6.8	Use structural analysis software to verify determined analysis of supported beams and girders.
Domain	***Building Systems***
5650.D7.1	Students properly size and integrate building systems related to mechanical, electrical, and plumbing (MEP) disciplines while conserving natural resources for residential and commercial structures.
5650.D7.2	Identify code requirements for the installation of mechanical, electrical, and plumbing (MEP) disciplines for a structure.
5650.D7.3	Read and interpret mechanical, electrical, and plumbing (MEP) discipline construction drawings.
5650.D7.4	Realize the requirements by an architect to understand how mechanical, electrical, and plumbing (MEP) discipline designs are designed and constructed within a structure.
5650.D7.5	Describe and analyze the appropriate options for the management of wastewater for a structure.
5650.D7.6	Examine how the placement of utilities effect design of the structure.
5650.D7.7	Assess mechanical, electrical, and plumbing systems for energy conservation techniques determined by geographic location.

Domain	Surveying & Hydrology
5650.D8.1	Students connect land surveying equipment components and theory to architectural and civil engineering projects to evaluate how land surveying impacts design and construction.
5650.D8.2	Analyze a site by performing a level survey.
5650.D8.3	Classify soil samples relevant to structure designs and their effect on a foundation system.
5650.D8.4	Analyze pre and post development stormwater run-off and implement a design solution associated with the change in stormwater run-off.
5650.D8.5	Compare and contrast site design factors and the impacts on the environment and surrounding properties.
5650.D8.6	Demonstrate site planning with consideration of local, state, and national building codes and client program/scope requirements.
5650.D8.7	Analyze drainage patterns, vegetation, and construction materials to determine the impact of design elements and methods to modify the surrounding terrain.
5650.D8.8	Recognize and distinguish between the different types of surveying and key vocabulary associated with the survey discipline.
5650.D8.9	Calculate cut and fill operations for a requirement on a site for the acquisition or disposal of soil.

Computer Integrated Manufacturing	
Career Cluster	Advanced Manufacturing
Program of Study	Engineering
NLPS Sequence	C
Course Code	5534
Course Description	*Computer Integrated Manufacturing is a course that applies principles of rapid prototyping, robotics, and automation. This course builds upon the computer solid modeling skills developed in Introduction of Engineering Design. Students will use computer controlled rapid prototyping and CNC equipment to solve problems by constructing actual models of their three-dimensional designs. Students will also be introduced to the fundamentals of robotics and how this equipment is used in an automated manufacturing environment. Students will evaluate their design solutions using various techniques of analysis and make appropriate modifications before producing their prototypes.* ***NOTE:*** *This course aligns with the PLTW Computer Integrated Manufacturing curriculum. Use of the PLTW curriculum may require additional training and membership in the PLTW network.*
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for new diploma

Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12	
Rules 46-47	● Industrial Technology K-12 ● Standard Trade & Industrial: Engineering 9-12 ● Occupational Specialist I, II or III: Engineering	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering ● Workplace Specialist: Engineering	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Engineering 5-12 ● Workplace Specialist: Engineering 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Project Management***	
5534.D1.1	Students will exhibit appropriate safety practices while working with tools and equipment.	
5534.D1.2	Demonstrate relevant safety practices when using tools and equipment as determined by task, materials, environment, and protective attire.	
5534.D1.3	Apply corrective action(s) to eliminate hazards.	
5534.D1.4	Understand the format and content of industry-based Material Safety Data Sheets (MSDS).	
5534.D1.5	Students will investigate various careers within the fields of engineering and technology.	
5534.D1.6	Identify engineering and technology occupations and the roles and responsibilities of each.	
5534.D1.7	Report job outlook, demand, and projected wages for engineering and technology careers.	

5534.D1.8	Explore job opportunities that are available in engineering and technology.
5534.D1.9	Investigate post-secondary training opportunities and industry certifications that are available.
5534.D1.10	Explore student professional organizations related to engineering and technology.
5534.D1.11	Students will communicate the design process.
5534.D1.12	Explain the importance of documentation.
5534.D1.13	Apply sketching and annotation skills to document work.
5534.D1.14	Produce working drawings using appropriate drawing styles and techniques.
5534.D1.15	Construct design models or finish models to display concepts of design or theory investigated.
5534.D1.16	Document project components into an engineering notebook (digital or paper).
5534.D1.17	Communicate technical knowledge in a variety of formats.
5534.D1.18	Utilize presentation software to create a presentation that outlines team or individual priorities for design and share with peers.
5534.D1.19	Document best work in a portfolio (digital or paper).
5534.D1.20	Students will apply appropriate research techniques.
5534.D1.21	Formulate unbiased research questions to collect information/data.
5534.D1.22	Apply appropriate investigative strategies.
5534.D1.23	Evaluate sources appropriate for academic research.
5534.D1.24	Select resources relevant to the identified problem.
5534.D1.25	Synthesize information collected during the research process.
5534.D1.26	Generate a list of sources used to gather information using APA or MLA format.
Domain	***Drawing Development and Communication in a Manufacturing Environment***
5534.D2.1	Students demonstrate the use of computer-aided design (CAD) software to effectively integrate communication the design process, possible solution, and execution of a project skills to solve a problem.
5534.D2.2	Connect knowledge of diverse cultures, including global and historical perspectives, to the manufacturing environment.
5534.D2.3	Recognize the impact of manufacturing processes on the environment.
5534.D2.4	Demonstrate the ability to use CAD/CAM Systems.
5534.D2.5	Utilize computer software for 2D profiling sketching functions.
5534.D2.6	Define sketched objects with dimensions and geometric constraints.
5534.D2.7	Identify the fundamentals of creating assembly models.
5534.D2.8	Demonstrate the proper application of annotations and reference dimensions while conforming to established drafting standards.
5534.D2.9	Inspect drawings for industry associated geometric, dimensioning, and tolerance (GD&T) standards.
5534.D2.10	Update model and drawing views using revision specification sheets.
5534.D2.11	Generate an assembly drawing, which includes views, balloons, and bills of material**.**
5534.D2.12	Recognize the wide array of industry-wide prototyping methods in use.
5534.D2.13	Choose the appropriate manufacturing process for a prototype.
Domain	***Robotics***
5534.D3.1	Students evaluate the history and principles of robotics so they can determine a need for robots.
5534.D3.2	Discuss the chronological development of automation leading to robotics.
5534.D3.3	Identify the positive impact robots have on manufacturing.

5534.D3.4	Students establish knowledge of robotics so they can effectively select and manipulate the proper robot for the task.
5534.D3.5	Define a robot.
5534.D3.6	Describe the basic components of robots and their capabilities.
5534.D3.7	Classify different types of robots.
5534.D3.8	Compare and implement various robotics coordinate systems, paths and work envelopes and their uses.
5534.D3.9	Analyze and compare the various drive systems used in robotics.
5534.D3.10	Analyze the degrees of freedom and axis of motion in different types of robots.
5534.D3.11	Differentiate control techniques in real and in computer simulations.
5534.D3.12	Apply concepts of physics to an automated manufacturing environment.
5534.D3.13	Describe the necessity for specialty tooling applications in robotics.
5534.D3.14	Design, program, and troubleshoot robotics systems.
Domain	***CNC***
5534.D4.1	Students evaluate the history and principles of computer numeric control so they can determine the need for CNC equipment.
5534.D4.2	Explain the history of computer-controlled machines charting the growth of numerical control (NC) and how it has been implemented into private industry.
5534.D4.3	Explain how the application of CNC machines has impacted manufacturing.
5534.D4.4	Explain the advantages and disadvantages of CNC machining.
5534.D4.5	Students evaluate proper methods for the setup and execution of CNC machining.
5534.D4.6	Examine different types of tool-holding devices used in CNC machine tools.
5534.D4.7	Describe the difference between reference and position points.
5534.D4.8	Plot points using absolute, relative (incremental) and polar coordinates.
5534.D4.9	Identify the optimum location for the Point of Reference (PRZ).
5534.D4.10	Complete a preliminary planning sheet to identify necessary work holding devices, cutting tools, reference points, machining sequences and safe operation.
5534.D4.11	Compare and contrast shop floor programming with offline programming.
5534.D4.12	Demonstrate the ability to safely set up, maintain, and operate a CNC machine center using appropriate documentation and procedures.
5534.D4.13	Examine part geometry to select appropriate cutting tools and fixture devices needed to create the part using a CNC machine.
5534.D4.14	Set up and edit the tool library of a CNC control program, providing offset values and tool geometry.
5534.D4.15	Calculate and verify appropriate spindle speeds and feed rates specific to each cutting tool utilized in an NC part program.
5534.D4.16	Verify NC part programs using simulation software before machining the part on a CNC device.
5534.D4.17	Follow a safety checklist before running an NC part program on a CNC machine.
5534.D4.18	Perform a dry run to verify the machine setup and program operation.
5534.D4.19	Students integrate computer aided manufacturing (CAM) systems to develop alpha-numeric codes.
5534.D4.20	Demonstrate the ability to operate the user interface with various CAM systems.
5534.D4.21	Demonstrate the ability to import and export CAD files using a CAM package.
5534.D4.22	Set up a CAM package by editing the material and tool libraries, defining stock sizes, selecting

	the appropriate post processor, and defining the units of measure to be used.
5534.D4.23	Define and apply the fundamental and advanced milling and turning procedures used in manufacturing processes.
Domain	***Automation***
5534.D5.1	Students evaluate the benefits of automated manufacturing.
5534.D5.2	Describe how the individual components of a flexible manufacturing system (FMS) are interrelated.
5534.D5.3	Recognize the benefits and problems associated with CIM technology and how they impact the manufacturing process.
5534.D5.4	Justify the need for computer integrated manufacturing within an organization.
5534.D5.5	Identify the typical components and subsystems that make up an automated machining, assembly, and process-type manufacturing operation.
5534.D5.6	Compare and contrast the benefits and drawbacks of the three categories of CIM systems.
5534.D5.7	Students apply concepts of machine communication to develop manufacturing processes.
5534.D5.8	Recognize the necessary safety precautions associated with a fully automated CIM system.
5534.D5.9	Develop machine order of operations.
5534.D5.10	Examine computer logic and scanning sequence in automated controls.
5534.D5.11	Describe the common parts of programmable logic controllers (PLC).
5534.D5.12	Design, program, and troubleshoot PLC systems.
5534.D5.13	Recognize the working relationship between the CNC mill and the robot.
5534.D5.14	Demonstrate how individual components work together to form a complete CIM system.

Digital Electronics	
Career Cluster	Advanced Manufacturing
Program of Study	Engineering; Electronics and Computer Technology
NLPS Sequence	C
Course Code	5538
Course Description	*Digital Electronics is a course of study in applied digital logic that encompasses the design and application of electronic circuits and devices found in video games, watches, calculators, digital cameras, and thousands of other devices. Instruction includes the application of engineering and scientific principles as well as the use of Boolean algebra to solve design problems. Using computer software that reflects current industry standards, activities should provide opportunities for students to design, construct, test, and analyze simple and complex digital circuitry software will be used to develop and evaluate the product design. This course engages students in critical thinking and problem-solving skills, time management and teamwork skills.* ***NOTE:*** *This course aligns with the PLTW Digital Electronics curriculum. Use of the PLTW curriculum may require additional training and membership in the PLTW network.*
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum

Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Engineering 9-12 ● Occupational Specialist I, II or III: Digital Electronics Technology ● Occupational Specialist I, II or III: Electronics Technology 9-12 or Industrial Electronics 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering ● Workplace Specialist: Digital Electronics Technology ● Workplace Specialist: Electronics Technology 9-12 or Industrial Electronics 9-12	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Engineering 5-12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Electronics Technology 9-12 or Industrial Electronics 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	EECT 111: Introduction to Circuit Analysis*; EECT 112: Digital Fundamentals	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications	Associate Certified Electronics Technician (CETa)	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Lab and Electrical Wiring Safety***	
5538.D1.1	Students apply concepts of lab and electrical wiring safety to ensure a safe work environment.	

5538.D1.2	Demonstrate wearing safety attire and following all classroom procedures related to safety.
5538.D1.3	Demonstrate methods to avoid electric shock by identifying the causes.
5538.D1.4	Utilizing environmentally sustainable design principles, design electronic circuits that reduce the negative impact on the environment while maintaining functions and safety.
5538.D1.5	Students will establish a working and functional knowledge of the software and equipment used in designing and troubleshooting circuits.
5538.D1.6	Create and test circuits using circuit design software.
5538.D1.7	Determine values associated with resistance, voltage, current and continuity using a digital multimeter.
5538.D1.8	Demonstrate successful soldering and desoldering techniques.
5538.D1.9	Demonstrate breadboarding techniques to build a working circuit.
Domain	***Basic Laws of Electricity***
5538.D2.1	Distinguish the parts of the atomic structure and how it plays a part in determining what elements are good conductors, insulators, and semi-conductors.
5538.D2.2	Define and explain Alternating Current (AC) and Direct Current (DC).
5538.D2.3	Distinguish between conventional current flow versus electron current flow and how they apply to engineering and scientific disciplines.
5538.D2.4	Design circuit boards that demonstrate the theory and principles associated with that of a complex circuit.
5538.D2.5	Calculate resistance, current and voltage in simple series, parallel and complex circuits using Ohm's Law.
5538.D2.6	Demonstrate the use of Kirchhoff's Voltage Law applied to simple series and complex circuits.
5538.D2.7	Demonstrate the use of Kirchhoff's Current Law for simple parallel and complex series-parallel circuits.
Domain	***Electrical Components***
5538.D3.1	Students apply concepts of the basic electrical components to design and create circuits.
5538.D3.2	Identify resistors by determining their nominal value.
5538.D3.3	Describe the material makeup of resistors and their application to circuit design.
5538.D3.4	Recognize industry standard symbols associated with resistors and their operation in schematic design.
5538.D3.5	Compare and contrast the measured value of a resistor to the calculated tolerance.
5538.D3.6	Identify the component parts of a capacitor, the types of capacitors available, ability to capture and contain static charge and voltage polarity requirements.
5538.D3.7	Identify and describe the unit of measure for capacitors.
5538.D3.8	Calculate the nominal values of different capacitors and their voltage polarity requirements.

5538.D3.9	Investigate types, functions, and power requirements of integrated circuits (logic gates).
5538.D3.10	Demonstrate the differences between an analog and cathode seven segment display.
Domain	***AC/DC Current Waveform***
5538.D4.1	Students analyze the characteristics of waveforms and voltage generation associated with AC and DC current.
5538.D4.2	Identify the anatomy of the waveform associated with AC and DC current.
5538.D4.3	Analyze both analog and digital waveforms
5538.D4.4	Differentiate between digital and analog signals when given a waveform.
5538.D4.5	Design, create and test circuits to calculate the output frequency of circuits using observations and the oscilloscope.
5538.D4.6	Calculate the duty cycle associated with a digital waveform using observations and the oscilloscope.
Domain	***Sequential Logic (Flip-Flops)***
5538.D5.1	Students create, analyze, and simplify digital logic circuits utilizing combinational and sequential logic.
5538.D5.2	Examine how to operate a circuit using sequential logic.
5538.D5.3	Compare and contrast between the different kinds of flip-flops.
5538.D5.4	Construct circuits and evaluate information about the various applications of flip- flops.
5538.D5.5	Demonstrate the differences associated with asynchronous and synchronous circuits.
5538.D5.6	Compare and evaluate how sequential logic determines the operation of a circuit waveform and how a truth table can be used to predict an outcome.
5538.D5.7	Use of flip-flops or latches to store data, act as a memory device or transfer data through a shift register.
5538.D5.8	Determine the proper selection and use of a small-scale integrated circuit (SSI) and medium scale integrated circuit (MSI).
Domain	***Number Systems, Simplifying***
5538.D6.1	Students convert and calculate number systems and sequences to simplify problems.
5538.D6.2	Convert numbers between the binary, hexadecimal, octal and decimal number systems.
5538.D6.3	Translate design specifications into truth tables using binary numbering system language.
5538.D6.4	Construct truth tables from logic expressions and vice versa.
5538.D6.5	Understand least significant bit and most significant bit numerical place value within a numbering system.
5538.D6.6	Use mathematical symbols to represent bases and communicate concepts using different number systems.
5538.D6.7	Demonstrate the relationship of binary and hexadecimal to bits and bytes of information used in computers.
5538.D6.8	Design, construct, and test adder circuits using both discrete and MSI gates to perform basic addition and subtraction using a binary numbering system.

5538.D6.9	Convert any number using appropriate SI unit prefixes.
Domain	***Programmable Logic Devices, State Machines, and Microprocessors***
5538.D7.1	Students design and create a microprocessor to understand the impact of design, creation, and implementation of a processor.
5538.D7.2	Understand how programmable logic devices (PLDs) are used to build and execute the operation of a circuit.
5538.D7.3	Develop an understanding of a state bubble and state diagram.
5538.D7.4	Construct a state transition table and derive equations for outputs at each state.
5538.D7.5	Construct a state machine circuit using multiple inputs and outputs.
5538.D7.6	Formulate a flowchart/pseudocode to correctly apply basic programming concepts in the planning of a project.
5538.D7.7	Execute a program using a microprocessor.

Environmental Sustainability		
Career Cluster	Advanced Manufacturing	
Program of Study	Engineering	
NLPS Sequence	C	
Course Code	4818	
Course Description	*Environmental Sustainability is a specialization course that builds upon prior knowledge learned in previous engineering and science courses. Students investigate and design solutions in response to current challenges such as providing the world with clean and abundant drinking water, an adequate food supply, and renewable energy. Students are introduced to environmental issues and use the engineering design process to design, build, and test potential solutions. This course engages critical thinking and problem-solving skills as students apply and extend their knowledge through designing experiments, managing projects, conducting research, and creating presentations to communicate solutions.*	
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a science course requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma If PLTW curriculum is used, PLTW training is required of the teacher	
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II*
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12	

	● Biology 7-12 ● Earth Science 7-12
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Occupational Specialist I, II or III: Engineering 9-12 ● Conservation & Environmental Studies 9-12 ● Biology 9-12 ● Earth/Space Science 9-12
Rules 2002	● Technology education with a high school setting ● CTE Trade & Industrial: Engineering ● A Workplace Specialist: Biotechnology Engineering ● Earth/Space Science with a high school setting ● Life Science with a high school setting
REPA/REPA 3	● Technology education 5-12 ● CTE Trade & Industrial: Engineering ● A Workplace Specialist: Biotechnology Engineering ● Earth/Space Science 5-12 ● Life Science 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	
4818.D1.1	Students consider systematic, ethical, and safe solutions to environmental problems.
4818.D1.2	Apply the steps of the design process to environmental sustainability problems.
4818.D1.3	Apply a professional code of ethics to environmentally sustainable solutions.
4818.D1.4	Apply safety practices when using materials, tools, and equipment.
4818.D1.5	Demonstrate proper use of aseptic techniques and containment measures.
4818.D1.6	Utilize specialized equipment appropriately.
4818.D1.7	Students will examine how engineering and technology can impact natural and engineered

	environments.
4818.D1.8	Investigate principles and practices of sustainability.
4818.D1.9	Analyze local and global impacts of engineered solutions on the environment, society, and the economy.
4818.D1.10	Identify examples of how biogeochemical processes inform and constrain engineered solutions.
4818.D1.11	Discuss examples of interconnectedness and interdependence of social, environmental, and economic systems.
4818.D1.12	Outline strategies that enable the identification and analysis of direct and indirect impacts of an engineered solution.
4818.D1.13	Students will explore and generate solutions to manage and protect water resources.
4818.D1.14	Evaluate case studies of shortages, contamination, and inadequate distribution of water supplies around the world.
4818.D1.15	Analyze direct and indirect use of water in our daily activities to determine the impact of lifestyle and diet on personal water usage.
4818.D1.16	Compare and contrast water usage from a personal and global perspective.
4818.D1.17	Evaluate water quality using biological and chemical methods to test for the presence of contaminants.
4818.D1.18	Design and construct a water purification device to remediate contaminated water.
4818.D1.19	Measure how effectively a water purification device removes contaminants.
4818.D1.20	Investigate how biological organisms can be used to accelerate water remediation.
4818.D1.21	Examine the effects of human activity on local and global water supplies.
4818.D1.22	Evaluate methods of remediation, purification, and treatment of water sources and wastewater.
4818.D1.23	Design and evaluate a system to remediate a local water supply after becoming polluted or contaminated.
4818.D1.24	Students will use biotechnology to investigate and propose solutions for world food security.
4818.D1.25	Examine threats to world food security.
4818.D1.26	Compare and contrast biotechnological and social solutions to world food security.
4818.D1.27	Analyze social, economic, and biological constraints and benefits to utilizing genetically modified organisms.
4818.D1.28	Extract and modify DNA from living cells to demonstrate application of the molecular biology principles required to perform this function.
4818.D1.29	Apply genetic engineering processes to modify an organism to solve a world food security problem.
4818.D1.30	Design a bio-engineered solution to a food security problem.
4818.D1.31	Students will explore, evaluate, and propose solutions to global energy demands using renewable energy sources.
4818.D1.32	Compare and contrast energy use from a personal and global perspective.
4818.D1.33	Analyze the types of energy systems used around the world.
4818.D1.34	Predict future energy needs in Indiana, the United States, and the world, based on current and historical data.
4818.D1.35	Use instrumentation to measure and quantify biological processes that generate biofuels.
4818.D1.36	Evaluate the role of renewable energy in a sustainable energy mix.
4818.D1.37	Describe processes used in industry to create biofuels.

4818.D1.38	Create a plan for an industrial scale application of a biofuel production process.
4818.D1.39	Produce precursors or biofuel products using living organisms such as algae and yeast.
4818.D1.40	Students will explore environmental science, engineering, and biotechnology related careers.
4818.D1.41	Investigate careers relating to environmental science, engineering, and biotechnology.
4818.D1.42	Analyze education and skill requirements for environmental science, engineering, and biotechnology professions.
4818.D1.43	Explore the outlook, demand, and projected wages for environmental science, engineering, and biotechnology careers.

Engineering Design and Development		
Career Cluster	Advanced Manufacturing	
Program of Study	Engineering	
NLPS Sequence	D	
Course Code	5698	
Course Description	*Engineering Design and Development is an engineering research course in which students work in teams to research, design, test, and construct a solution to an open-ended engineering problem. The product development life cycle and a design process are used to guide the team to reach a solution to the problem. The team and/or individual(s)communicates their solution to a panel of stakeholders at the conclusion of the course. As the capstone course in the Engineering Pathway, EDD engages students in critical thinking, problem-solving, time management, and teamwork skills.* ***NOTE:** This course aligns with the PLTW Engineering Design and Development curriculum. Use of the PLTW curriculum may require additional training and membership in the PLTW network.*	
Prerequisite(s)/ Corequisite(s)	Introduction to Engineering Design; Principles of Engineering; and one pre-engineering specialty course	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12	
Rules 46-47	● Industrial Technology K-12 ● Standard Trade & Industrial: Engineering 9-12 ● Occupational Specialist I, II or III: Engineering	

Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering ● Workplace Specialist: Engineering
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Engineering 5-12 ● Workplace Specialist: Engineering 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Advanced Manufacturing Industry 4.0 – Smart Manufacturing							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7220	Principles of Industry 4.0 and Digital Manufacturing	4728	Robotics Design and Innovation	7100	Digital Manufacturing Systems	7222	Advanced Manufacturing - Industry 4.0 Capstone
						7250	Semiconductor and EV Battery Manufacturing Capstone

Principles of Industry 4.0 - Smart Manufacturing		
Career Cluster	Advanced Manufacturing	
Program of Study	Industry 4.0 – Smart Manufacturing; Industrial Automation and Robitics; Industrial Maintenance Electrical; Industrial Maintenance Mechanical	
NLPS Sequence	A	
Course Code	7220	
Course Description	*Principles of Industry 4.0 introduces students to the Industrial Internet of Things (IIoT). Students will explore Industry 4.0 technologies such as artificial intelligence (AI), human to robot collaboration, big data, safety, electrical, sensors, digital integration, fluid power, robot operation, measurement, CAD, CNC, additive manufacturing, print reading, and technical mathematics. Students will complete hands-on labs, virtual simulations, projects, and critical thinking assignments to help prepare for SACA C-101 Certified Industry 4.0 Associate I - Basic Operations certification exam.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Manufacturing K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II, or III: Engineering	

	● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Occupational Specialist I, II or III: Manufacturing 9-12
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering or Manufacturing ● Workplace Specialist: Engineering or Manufacturing 9-12
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Industrial Automation & Robotics ● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SMDI 110: Introduction to Industrial Internet of Things
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC- CT Smart Manufacturing and Digital Integration (15.0405); TC Smart Manufacturing and Digitial Integration (15.0405)
Liberal Arts/Sciences Requirements	ITCC- MATH 137: Trigonometry with Analytic Geometry, IVYT 11X Student Success
Promoted Certifications	SACA C-101 Certified Industry 4.0 Associate I - Basic Operations
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Industry 4.0***
7220.D1.1	Identify the components of the Industrial Internet of Things (IIoT).
7220.D1.2	Recognize that IIoT is the building block for Smart Manufacturing and Digital Integration.
7220.D1.3	Recognize how equipment monitoring plays a major role in predictive maintenance, lean manufacturing, and quality.
7220.D1.4	Demonstrate how Industry 4.0 concepts are changing the manufacturing world.
7220.D1.5	Execute basic setup, adjustment & operation of automated machines that may include CNC, robotics, 3D Printers, laser engraving, etc.
7220.D1.6	Discuss multiple aspects of industrial prints/drawings that are used in manufacturing.
7220.D1.7	Demonstrate an understanding of technical math, US customary, metric system, and metrology.
7220.D1.8	Recall content pertaining to General Industrial Safety to successfully obtain the OSHA 10 Hour General Industry Certification.
7220.D1.9	Recall fundamental content to meet/exceed the cut-score for the SACA (Smart Automation Certification Alliance) C-101 Certified Industry 4.0 Associate - Basic Operations - Silver Certification.
7220.D1.10	Demonstrate skills to obtain the SACA C-101 Certified Industry 4.0 Associate - Basic Operations - Gold Certification at 100% of skill standard.

Domain	***Career Navigation***
7220.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7220.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7220.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7220.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7220.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7220.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7220.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7220.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7220.D4.1	Demonstrate computer literacy skills and basic computer functions.
7220.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7220.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7220.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Robotics Design and Innovation	
Career Cluster	Advanced Manufacturing
Program of Study	Industry 4.0 – Smart Manufacturing; Industrial Automation and Robotics; Industrial Maintenance Electrical; Industrial Maintenance Mechanical
NLPS Sequence	B
Course Code	4728
Course Description	*The Robotics Design and Innovation course is designed to introduce students to technology that is revolutionizing modern manufacturing and logistic centers across global markets. Students will explore careers that are related to the fourth industrial revolution and be introduced to the emerging technologies that make the manufacturing world ever changing. These technologies include; mechatronics, CAD/CAM, robots, programmable automation, cloud technologies, networking, big data and analytics. Students will design a part to be mass produced using processes such as additive and subtractive manufacturing, while utilizing lean manufacturing concepts. The course will prepare students for the SACA, C-102 Certified Industry 4.0 Associate*

Prerequisite(s)/ Corequisite(s)	Principles of Industry 4.0 – Smart Manufacturing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Manufacturing K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II, or III: Engineering ● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Occupational Specialist I, II or III: Manufacturing 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering or Manufacturing ● Workplace Specialist: Engineering or Manufacturing 9-12	
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Industrial Automation & Robotics ● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SMDI 111: Technology in Smart Manufacturing and Digital Integration	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC- CT: Smart Manufacturing and Digital Integration (15.0405); TC: Smart Manufacturing and Digitial Integration (15.0405)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	SACA C-102 Certified Industry 4.0 Associate - Advanced Operations Certification	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Safety***	
4728.D1.1	Demonstrate safety hazards and application of safe work practices when working with	

	industrial equipment and hand tools.
Domain	***Career Exploration***
4728.D2.1	Communicate an occupation one could expect to obtain, and the skills needed in the fourth industrial revolution.
Domain	***Smart Manufacturing and Digital Integration***
4728.D3.1	Differentiate between additive and subtractive manufacturing.
4728.D3.2	Execute software at an introductory level for graphical communication.
4728.D3.3	Produce a production part that utilizes advanced manufacturing processes as a team member.
4728.D3.4	Describe how components in modern manufacturing facilities work and communicate with each other.
4728.D3.5	Create a simple handling tool program using an industrial robot.
4728.D3.6	Recall fundamental content to meet/exceed the cut-score for the SACA (Smart Automation Certification Alliance) C-102 - Certified Industry 4.0 Associate II - Advanced Operations - Silver Certification.
4728.D3.7	Demonstrate skills to obtain the SACA C-102 - Certified Industry 4.0 Associate II - Advanced Operations - Gold Certification at a 100% skill standard.
4728.D3.8	Demonstrate the ability to create and interpret technical documents.
4728.D3.9	Demonstrate ability to use various types of software applicable to the course.

Smart Manufacturing Systems	
Career Cluster	Advanced Manufacturing
Program of Study	Industry 4.0 – Smart Manufacturing
NLPS Sequence	C
Course Code	7100
Course Description	*Smart Manufacturing Systems will deepen students' technical skills by studying the electrical system required to support an Industry 4.0 manufacturing system and building on skills learned in Principles of Industry 4.0 and Robotics Design and Innovation. Topics include Industry 4.0 technologies such as data analytics, cyber security, and smart sensors. Students will work on a 4-6 student team to build a working prototype of an Industry 4.0 system. Highlights include: Variable Frequency Drives, PLC troubleshooting, Cyber Security, Smart Sensors, and Smart network communications.*
Prerequisite(s)/ Corequisite(s)	Principles of Industry 4.0 and Digital Manufacturing; Robotics Design and Innovation
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit under the new diploma
Dual Credit Status	X (PCL/CTE)
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Manufacturing K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II, or III: Engineering ● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Occupational Specialist I, II or III: Manufacturing 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering or Manufacturing ● Workplace Specialist: Engineering or Manufacturing 9-12	
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Industrial Automation & Robotics ● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SMDI 130: Electrical Systems in Manufacturing; INDT 205: Programmable Automation Controls I	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC- CT Smart Manufacturing and Digital Integration (15.0405); TC Smart Manufacturing and Digitial Integration (15.0405)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	SACA C-104 Certified Industry 4.0 Associate - IIoT, Networking & Data Analytics Certification	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Electrical System***	
7100.D1.1	Apply electrical system safety	
7100.D1.2	Connect and operate basic electrical circuits	
7100.D1.3	Interpret electrical schematics and diagrams	
7100.D1.4	Use a digital multimeter (DMM) to make electrical measurements	
7100.D1.5	Analyze basic load circuits	
7100.D1.6	Test and replace/reset fuses and circuit breakers	
7100.D1.7	Connect and operate basic reactive components	
7100.D1.8	Analyze basic combination circuits	

7100.D1.9	Troubleshoot basic series and parallel electrical circuits
7100.D1.10	Connect and operate single-phase transformer circuits
7100.D1.11	Analyze Inductive Circuits
7100.D1.12	Analyze Capacitive Circuits
Domain	***Industrial Internet of Things (IIoT), Networking, Data Analytics***
7100.D2.1	Optimize overall equipment effectiveness (OEE)
7100.D2.2	Identify and eliminate production bottlenecks
7100.D2.3	Configure and use a cloud-based data acquisition system
7100.D2.4	Identify Industrial Internet of Things (IIoT) components
7100.D2.5	Use a keypad to operate an AC variable frequency drive (VFD)
7100.D2.6	View and edit basic VFD parameters
7100.D2.7	Interpret a PLC program that controls 2/3-wire VFD operation
7100.D2.8	Operate and monitor a PLC-controlled VFD
7100.D2.9	Reset a VFD after an error occurs
7100.D2.10	Operate and monitor a PLC system
7100.D2.11	Configure a PLC to PC Ethernet/IP Driver
7100.D2.12	Create and edit a PLC project
7100.D2.13	Use status and diagnostic indicators to troubleshoot a PLC system
7100.D2.14	Troubleshoot a PLC system with discrete I/O
7100.D2.15	Connect and configure a managed Ethernet network
7100.D2.16	View Ethernet switch network performance and diagnostics
7100.D2.17	Configure port security of a managed industrial Ethernet switch
7100.D2.18	Configure a virtual LAN using a managed Ethernet switch
7100.D2.19	Adjust and operate a flat belt conveyor
7100.D2.20	Interpret and operate a PLC program that controls a mechatronic system sequence
7100.D2.21	Interpret and operate a robot program that uses a traverse axis
7100.D2.22	Interpret and operate a PLC program that uses discrete I/O handshaking
7100.D2.23	Interpret and operate PLC and robot programs that use Ethernet I/O handshaking
7100.D2.24	Connect and configure an IO-Link Master
7100.D2.25	Connect and operate an IO-Link RFID reader system
7100.D2.26	Interpret and operate a PLC program that uses an IO-Link RFID function block
7100.D2.27	Connect and configure an Ethernet-serial interface
7100.D2.28	Connect and operate a barcode reader
7100.D2.29	Interpret and operate a PLC program that uses barcode reader function block
7100.D2.30	Connect, configure, and operate an IO-Link sensor
7100.D2.31	Interpret and operate a PLC program that uses an IO-Link sensor
7100.D2.32	Interpret and operate a PLC project that tracks production statistics
7100.D2.33	Configure and use a cloud-based SCADA system to track production statistics
7100.D2.34	Configure and use a cloud-based maintenance management system
7100.D2.35	Create and manually populate an SQL database to store data from automation
7100.D2.36	Use a basic query to display and analyze data from an SQL database

Industry 4.0 - Smart Manufacturing Capstone		
Career Cluster	Advanced Manufacturing	
Program of Study	Industry 4.0 – Smart Manufacturing	
NLPS Sequence	D	
Course Code	7222	
Course Description	*Industry 4.0 - Smart Manufacturing Capstone introduces the basic theory, operation, and programming of industrial robots and their applications through simulations and hands-on laboratory activities. Basic theory, operation, and programming of Programmable Logic Controllers (PLC) will be emphasized in this course along with how automation devices may be integrated with other machines. Multiple industry standard certifications in the field of robotics and automation will be available depending on the length of the course. As a capstone course, students are encouraged to participate in an intensive, embedded work-based learning experience.*	
Prerequisite(s)/ Corequisite(s)	Principles of Industry 4.0 and Digital Manufacturing; Robotics Design and Innovation; Smart Manufacturing Systems	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Industrial Arts K-12	
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Occupational Specialist I, II or III: Industrial Automation 9-12 ● Industrial Technology 9-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● Technology Education with high school setting ● Workplace Specialist: Industrial Automation & Robotics	
REPA/REPA 3	● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● Technology Education 5-12 ● Workplace Specialist: Industrial Automation & Robotics 9-12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	ADMF 116: Industrial Robotics I; ADMF 206: Industrial Robotics II*	
VU Course Alignment		

Four Yr. Course Alignment	
Postsecondary Credential	ITCC- CT Smart Manufacturing and Digital Integration (15.0405); TC Smart Manufacturing and Digitial Integration (15.0405)
Liberal Arts/Sciences Requirements	
Promoted Certifications	Certified Industry 4.0 Associate – Fundamentals (Level 1 Capstone)

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Industrial Robotics I***
7222.D1.1	Identify safety hazards and apply safe working practices when working with automated equipment.
7222.D1.2	Demonstrate the ability to create and set up a robotic work cell.
7222.D1.3	Demonstrate an ability to properly start up, operate, and shut down an industrial robot.
7222.D1.4	Create and execute robot programs in teach mode and playback mode.
7222.D1.5	Demonstrate ability to define tool center points.
7222.D1.6	Develop an understanding of various coordinate systems used in robotic programming.
7222.D1.7	Demonstrate ability to backup and restore robot programs.
7222.D1.8	Demonstrate an ability to recover robot operation from common faults.
7222.D1.9	Demonstrate an ability to monitor and operate robot inputs & outputs.
7222.D1.10	Create and execute MACROs.
7222.D1.11	Demonstrate an ability to create programs with subroutine structure.
7222.D1.12	Recognize how multiple robots, PLC's, and CNC types of equipment integrate with each other.
7222.D1.13	Demonstrate an ability to edit programmed positions.
7222.D1.14	Demonstrate ability to read and interpret technical documents.
7222.D1.15	Demonstrate the ability to use various types of software applicable to course.
7222.D1.16	Assess readiness to take the SACA C-215 Robot System Operations I Certification exam.
Domain	***Programmable Logic Controllers***
7222.D2.1	Review basic computer operations.
7222.D2.2	Program from relay logic to ladder logic diagrams.
7222.D2.3	Design timer circuits and logic circuits.
7222.D2.4	Describe logic circuits.
7222.D2.5	Describe the common parts of programmable controllers.
7222.D2.6	Program a start/stop circuit using a PLC.
7222.D2.7	Program counters and timers using a programmable controller.
7222.D2.8	Install and troubleshoot a simple programmable controller system.
7222.D2.9	Discuss input and output analog signals to/ from the PLC.
7222.D2.10	Discuss sequencers.
7222.D2.11	Demonstrate ability to read and interpret technical documents.
7222.D2.12	Demonstrate the ability to use various types of software applicable to course.
7222.D2.13	Assess readiness to take the SACA C-207 Programmable Controller Systems 1 Certification

	exam.
Domain	***Industrial Robotics II***
7222.D3.1	Continued study of safety hazards and application of safe work practices when working with automated robotic equipment.
7222.D3.2	Demonstrate the ability to write advanced teach pendant programs.
7222.D3.3	Understand the integration process of robots into a multi robot work cell using various types of computer-controlled equipment including the PLC and HMI.
7222.D3.4	Communicate effectively utilizing industry vernacular.
7222.D3.5	Solve technical problems using critical thinking skills.
7222.D3.6	Effectively troubleshoot error codes and return service to a non-functioning robot.
7222.D3.7	Demonstrate how to master and calibrate a robot.
7222.D3.8	Discuss the various applications of EOAT and the nature of automatic tool changing.
7222.D3.9	Apply basic knowledge of robot physics in an automated robotic work cell.
7222.D3.10	Prepare to earn industry recognized robotic certifications.
7222.D3.11	Demonstrate the ability to create and interpret technical documents.
7222.D3.12	Demonstrate the ability to use various types of software applicable to course.
7222.D3.13	Demonstrate an ability to create a simulated work-cell using leading edge software.
7222.D3.14	Assess readiness to take the FANUC Certified Robot Operator-1 certification exam.

Advanced Manufacturing Industrial Automation and Robotics							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7108	Principles of Advanced Manufacturing	7103	Advanced Manufacturing Technology	7106	Mechatronics Systems	7224	Automation and Robotics Capstone
7220	Principles of Industry 4.0 – Smart Manufacturing	4728	Robotics Design and Innovation				

Principles of Advanced Manufacturing		
Career Cluster	Advanced Manufacturing	
Program of Study	Industrial Automation and Robotics, Industrial Maintenance – Electrical, Industrial Maintenance – Mechanical	
NLPS Sequence	A	
Course Code	7108	
Course Description	*Principles of Advanced Manufacturing is a course that includes classroom and laboratory experiences in Industrial Technology and Manufacturing Trends. Domains include safety and impact, manufacturing essentials, lean manufacturing, design principles, and careers in advanced manufacturing. Hands-on projects and team activities will allow students to apply learning on the latest industry technologies. Work-based learning experiences and industry partnerships are highly encouraged for an authentic industry experience.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial ArtsK-12	
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12	

	● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Manufacturing 9-12 ● Occupational Specialist I, II or III: Industrial Automation 9-12 ● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● CTE: Trade & Industrial: Industrial Repair & Maintenance ● Workplace Specialist: Engineering or Manufacturing ● Technology Education with high school setting ● Workplace Specialist: Industrial Automation & Robotics ● Workplace Specialist: Industrial Repair & Maintenance
REPA/REPA 3	● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● CTE: Trade & Industrial: Industrial Automation & Robotics 5-12 ● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● Technology Education 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12 ● Workplace Specialist: Industrial Automation & Robotics 9-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ADMF 101: Key Principles of Advanced Manufacturing OR SMDI 110: Introduction to Industrial Internet of Things
VU Course Alignment	PMTD 110/110L (Lab): Manufacturing Processes; DRAF 140: Introduction to CAD
Four Yr. Course Alignment	
Postsecondary Credential	ITCC- TC Automation and Robotics Technology (15.0613) VU- CG Machinery Repair Assistant (15.0406); CG Industrial Technology (15.0612)
Liberal Arts/Sciences Requirements	ITCC- MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Advanced Manufacturing***
7108.D1.1	Understand the importance of the manufacturing industry, and introduction to common manufacturing concepts through direct interaction with industry.
7108.D1.2	Conduct assigned tasks in a safe and workmanlike manner while working independently or in small groups.
7108.D1.3	Discuss the need for workplace safety and workplace safety training programs as covered by the OSHA 10 Hour program:
7108.D1.4	Attain readiness to take OSHA 10 Hour General Industry Certification exam.

7108.D1.5	Discuss quality systems and reference common manufacturing examples
7108.D1.6	Use quantitative analytical skills to evaluate and process numerical data.
7108.D1.7	Discuss basic blueprint reading fundamentals
7108.D1.8	Discuss basic measurement systems.
7108.D1.9	Perform basic measurements using precision measuring tools.
7108.D1.10	Demonstrate the ability to read and interpret technical documents.
7108.D1.11	Utilizing and applying software where appropriate to the course.
7108.D1.12	Attain readiness to take MSSC Safety and Quality Certification exam.
Domain	***Career Navigation***
7108.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7108.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7108.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7108.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7108.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7108.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7108.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7108.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7108.D4.1	Demonstrate computer literacy skills and basic computer functions.
7108.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7108.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7108.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Principles of Industry 4.0 - Smart Manufacturing	
Career Cluster	Advanced Manufacturing
Program of Study	Industry 4.0 – Smart Manufacturing; Industrial Automation and Robitics; Industrial Maintenance Electrical; Industrial Maintenance Mechanical
NLPS Sequence	A
Course Code	7220

Course Description	*Principles of Industry 4.0 introduces students to the Industrial Internet of Things (IIoT). Students will explore Industry 4.0 technologies such as artificial intelligence (AI), human to robot collaboration, big data, safety, electrical, sensors, digital integration, fluid power, robot operation, measurement, CAD, CNC, additive manufacturing, print reading, and technical mathematics. Students will complete hands-on labs, virtual simulations, projects, and critical thinking assignments to help prepare for SACA C-101 Certified Industry 4.0 Associate I - Basic Operations certification exam.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Manufacturing K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II, or III: Engineering ● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Occupational Specialist I, II or III: Manufacturing 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering or Manufacturing ● Workplace Specialist: Engineering or Manufacturing 9-12	
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Industrial Automation & Robotics ● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SMDI 110: Introduction to Industrial Internet of Things	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC- CT Smart Manufacturing and Digital Integration (15.0405); TC Smart Manufacturing and Digitial Integration (15.0405)	
Liberal Arts/Sciences	ITCC- MATH 137: Trigonometry with Analytic Geometry, IVYT 11X Student Success	

Requirements	
Promoted Certifications	SACA C-101 Certified Industry 4.0 Associate I - Basic Operations
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Industry 4.0***
7220.D1.1	Identify the components of the Industrial Internet of Things (IIoT).
7220.D1.2	Recognize that IIoT is the building block for Smart Manufacturing and Digital Integration.
7220.D1.3	Recognize how equipment monitoring plays a major role in predictive maintenance, lean manufacturing, and quality.
7220.D1.4	Demonstrate how Industry 4.0 concepts are changing the manufacturing world.
7220.D1.5	Execute basic setup, adjustment & operation of automated machines that may include CNC, robotics, 3D Printers, laser engraving, etc.
7220.D1.6	Discuss multiple aspects of industrial prints/drawings that are used in manufacturing.
7220.D1.7	Demonstrate an understanding of technical math, US customary, metric system, and metrology.
7220.D1.8	Recall content pertaining to General Industrial Safety to successfully obtain the OSHA 10 Hour General Industry Certification.
7220.D1.9	Recall fundamental content to meet/exceed the cut-score for the SACA (Smart Automation Certification Alliance) C-101 Certified Industry 4.0 Associate - Basic Operations - Silver Certification.
7220.D1.10	Demonstrate skills to obtain the SACA C-101 Certified Industry 4.0 Associate - Basic Operations - Gold Certification at 100% of skill standard.
Domain	***Career Navigation***
7220.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7220.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7220.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7220.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7220.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7220.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7220.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7220.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7220.D4.1	Demonstrate computer literacy skills and basic computer functions.
7220.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and

	active listening in formal and informal settings.
7220.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7220.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Advanced Manufacturing Technology		
Career Cluster	Advanced Manufacturing	
Program of Study	Industrial Automation and Robotics	
NLPS Sequence	B	
Course Code	7103	
Course Description	*Advanced Manufacturing Technology introduces students to a variety of manufacturing processes and procedures that are used in real-world manufacturing environments. The course covers key electrical principles—including current, voltage, resistance, power, inductance, capacitance, and transformers—as well as the basic principles of mechanical and fluid power. Additional course topics include, types of production, production materials, machining and tooling, manufacturing planning, production control, and product distribution. Students will be expected to understand the product life cycle from conception through distribution. This course also focuses on technologies used in production processes such as basic power systems, energy transfer systems, and machine operation. The course utilizes a combination of lecture, lab, online simulation, and programming to prepare students for Certified Production Technician Testing through Manufacturing Skill Standards Council (MSSC).*	
Prerequisite(s)/ Corequisite(s)	Principles of Advanced Manufacturing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial ArtsK-12	
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Manufacturing 9-12	

	● Occupational Specialist I, II or III: Industrial Automation 9-12 ● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● CTE: Trade & Industrial: Industrial Repair & Maintenance ● Workplace Specialist: Engineering or Manufacturing ● Technology Education with high school setting ● Workplace Specialist: Industrial Automation & Robotics ● Workplace Specialist: Industrial Repair & Maintenance
REPA/REPA 3	● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● CTE: Trade & Industrial: Industrial Automation & Robotics 5-12 ● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● Technology Education 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12 ● Workplace Specialist: Industrial Automation & Robotics 9-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ADMF 102: Technology in Advanced Manufacturing OR SMDI 111: Technology in Smart Manufacturing and Digital Integration; INDT 113: Industrial Electrical I
VU Course Alignment	CIMT 100/L: Electronics for Automation/ Electronics for Automation Laboratory
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Automation and Robotics Technology (15.0613) VU - CG Machinery Repair Assistant (15.0406); CG Industrial Technology (15.0612)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, UCC Electives 3 hours
Promoted Certifications	MSSC Certified Production Technician; SACA C-201
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Advanced Manufacturing Technology***
7103.D1.1	Conduct assigned tasks in a safe and workmanlike manner while working either independently or in small groups
7103.D1.2	Identify basic manufacturing processes and major types of production systems.
7103.D1.3	Define common properties of industrial materials, their application, testing and enhancement
7103.D1.4	Describe the design, tooling, and production aspects of manufacturing.
7103.D1.5	Demonstrate a general knowledge of non-traditional manufacturing processes and automation.
7103.D1.6	Explain the basic concepts of electrical, hydraulic, and pneumatic power systems.
7103.D1.7	Describe and solve for basic electrical quantities such as voltage, amperage, resistance, and power.

7103.D1.8	Describe the types of basic fluid power systems used in manufacturing.
7103.D1.9	Determine fluid system properties such as pressure, flow, viscosity, and pressure drop
7103.D1.10	Identify the common types and operation of bearing, coupling, belt, and chain systems.
7103.D1.11	Identify physical principles including force, torque, simple machines, and mechanical drives.
7103.D1.12	Describe the basic concepts of machine control, machine automation, and electrical control.
7103.D1.13	Communicate effectively using listening, speaking, reading, and writing skills.
7103.D1.14	Use quantitative analytical skills to evaluate and process numerical data.
7103.D1.15	Solve problems using critical and creative thinking skills.
7103.D1.16	Utilize and apply software where appropriate to the course.
7103.D1.17	Attain readiness to take MSSC Production and Maintenance Awareness Certification exams.
7103.D1.18	Demonstrate ability to read and interpret technical documents.
7103.D1.19	Demonstrate the ability to use various types of software applicable to course.
Domain	***Electrical Power***
7103.D2.1	Demonstrate proper safety precautions related to equipment.
7103.D2.2	Define the following terms: voltage, resistance, current amperage, direct current, alternating current, and power supply.
7103.D2.3	Identify electrical components and form a schematic diagram.
7103.D2.4	Identify types of electrical mechanical switches (SPDT, DPDT, etc.)
7103.D2.5	Calculate voltage, current, and resistance in series, parallel, and series-parallel circuits using Ohm's Law.
7103.D2.6	Perform voltage, current, and resistance measurements using the proper measurement devices (both analog and digital meters).
7103.D2.7	Create a schematic drawing and complete single phase AC electrical service connections including meter bases and service panels.
7103.D2.8	Identify basic principles and characteristics of transformers, resistors, capacitors and diodes.
7103.D2.9	Calculate values for AC and DC resistive, inductive, and capacitive components.
7103.D2.10	Assemble and test laboratory exercises including building single phase AC switched circuits, and circuits using mechanical relays.
7103.D2.11	Demonstrate ability to read and interpret technical documents.
7103.D2.12	Demonstrate ability to use various types of software applicable to course.
7103.D2.13	Recall fundamental content to meet/exceed the cut-score for the SACA (Smart Automation Certification Alliance) C-201 Electrical Systems I Certification exam - Silver Certification.
7103.D2.14	Demonstrate skills to obtain the SACA C-201 Electrical Systems I Certification exam - Gold Certification at a 100% of skill standard.
7103.D3.1	Demonstrate understanding of the basic functions of PLC's

Robotics Design and Innovation	
Career Cluster	Advanced Manufacturing
Program of Study	Industry 4.0 – Smart Manufacturing; Industrial Automation and Robotics; Industrial Maintenance Electrical; Industrial Maintenance Mechanical
NLPS Sequence	B

Course Code	4728	
Course Description	*The Robotics Design and Innovation course is designed to introduce students to technology that is revolutionizing modern manufacturing and logistic centers across global markets. Students will explore careers that are related to the fourth industrial revolution and be introduced to the emerging technologies that make the manufacturing world ever changing. These technologies include; mechatronics, CAD/CAM, robots, programmable automation, cloud technologies, networking, big data and analytics. Students will design a part to be mass produced using processes such as additive and subtractive manufacturing, while utilizing lean manufacturing concepts. The course will prepare students for the SACA, C-102 Certified Industry 4.0 Associate*	
Prerequisite(s)/ Corequisite(s)	Principles of Industry 4.0 – Smart Manufacturing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Manufacturing K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II, or III: Engineering ● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Occupational Specialist I, II or III: Manufacturing 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering or Manufacturing ● Workplace Specialist: Engineering or Manufacturing 9-12	
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Industrial Automation & Robotics ● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SMDI 111: Technology in Smart Manufacturing and Digital Integration	
VU Course Alignment		
Four Yr. Course Alignment		

Postsecondary Credential	ITCC- CT: Smart Manufacturing and Digital Integration (15.0405); TC: Smart Manufacturing and Digitial Integration (15.0405)
Liberal Arts/Sciences Requirements	
Promoted Certifications	SACA C-102 Certified Industry 4.0 Associate - Advanced Operations Certification

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Safety***
4728.D1.1	Demonstrate safety hazards and application of safe work practices when working with industrial equipment and hand tools.
Domain	***Career Exploration***
4728.D2.1	Communicate an occupation one could expect to obtain, and the skills needed in the fourth industrial revolution.
Domain	***Smart Manufacturing and Digital Integration***
4728.D3.1	Differentiate between additive and subtractive manufacturing.
4728.D3.2	Execute software at an introductory level for graphical communication.
4728.D3.3	Produce a production part that utilizes advanced manufacturing processes as a team member.
4728.D3.4	Describe how components in modern manufacturing facilities work and communicate with each other.
4728.D3.5	Create a simple handling tool program using an industrial robot.
4728.D3.6	Recall fundamental content to meet/exceed the cut-score for the SACA (Smart Automation Certification Alliance) C-102 - Certified Industry 4.0 Associate II - Advanced Operations - Silver Certification.
4728.D3.7	Demonstrate skills to obtain the SACA C-102 - Certified Industry 4.0 Associate II - Advanced Operations - Gold Certification at a 100% skill standard.
4728.D3.8	Demonstrate the ability to create and interpret technical documents.
4728.D3.9	Demonstrate ability to use various types of software applicable to the course.

Mechatronics Systems	
Career Cluster	Advanced Manufacturing
Program of Study	Industrial Automation and Robotics
NLPS Sequence	C
Course Code	7106
Course Description	*Mechatronics Systems covers the basic electrical and mechanical components and functions of a complex mechatronics system. Through a systems-based approach, students learn about the mechanical components that lead and support the flow of energy through a mechanical*

	system. Emphasis is placed on the development of strategies for increasing efficiency and reducing wear and tear. After gaining an understanding of the complete system, students learn and apply troubleshooting strategies to identify, localize, and (where possible) correct malfunctions. Preventive maintenance of mechanical elements and electrical drives as well as safety issues within the system are also discussed.
Prerequisite(s)/ Corequisite(s)	Principles of Advanced Manufacturing (7108) **AND** Advanced Manufacturing Technology (7103) **OR** Principles of Industry 4.0 – Smart Manufacturing (7220) **AND** Robotics Design and Innovation (4728)
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level I
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial Arts K-12
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Manufacturing 9-12 ● Occupational Specialist I, II or III: Industrial Automation 9-12 ● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● CTE: Trade & Industrial: Industrial Repair & Maintenance ● Workplace Specialist: Engineering or Manufacturing ● Technology Education with high school setting ● Workplace Specialist: Industrial Automation & Robotics ● Workplace Specialist: Industrial Repair & Maintenance
REPA/REPA 3	● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● CTE: Trade & Industrial: Industrial Automation & Robotics 5-12 ● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● Technology Education 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12 ● Workplace Specialist: Industrial Automation & Robotics 9-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ADMF 112: Mechanical Drives I; ADMF 122: Industrial Electrical II

VU Course Alignment	VU-EC - CIMT 175/L (Lab): Mechatronics/Mechatronics Laboratory
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Automation and Robotics Technology (15.0613) VU-EC - CG Machinery Repair Assistant (15.0406)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology
Promoted Certifications	Applied Industry 4.0/FESTO

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Electrical and Robot Systems***
7106.D1.1	Understand the hazards of electromechanical equipment and apply safe working practices.
7106.D1.2	Describe the basic functions and design of a robotic mechatronic system.
7106.D1.3	Apply basic knowledge of robot physics in a mechatronics system.
7106.D1.4	Explain the role of various electrical components within a robotic mechatronic system.
7106.D1.5	Trace and describe the flow of energy and information in a robotic mechatronic system.
7106.D1.6	Describe the basic physical properties of electrical components.
7106.D1.7	Read, analyze, and utilize technical documents such as data sheets, timing diagrams, operational manuals, schematics, etc. for a mechatronic system.
7106.D1.8	Carry out measurements and adjustments on electrical components/circuits in a mechatronic system.
7106.D1.9	Localize, identify, document and correct (where possible) malfunctions in electrical circuits, based upon the technical documentation.
7106.D1.10	Transfer the knowledge learned from one system to another system.
7106.D1.11	Effectively use current and emerging computer technologies when applicable.
7106.D1.12	Demonstrate ability to read and interpret technical documents.
7106.D1.13	Demonstrate the ability to use various types of software applicable to course.
Domain	***Mechanical Systems***
7106.D2.1	Understand the hazards of electromechanical equipment and apply safe working practices.
7106.D2.2	Explain the role of various mechanical components within a given system or module.
7106.D2.3	Trace and describe the flow of energy in a given mechatronic system or subsystem.
7106.D2.4	Describe the basic physical properties of mechanical components including materials, lubrication requirements, and surface properties.
7106.D2.5	Carry out adjustments on mechanical components in a mechatronic system.
7106.D2.6	Read, analyze, and utilize the technical data sheets for the mechanical components and electrical drives within a mechatronic system.
7106.D2.7	Correctly localize, identify and document causes of malfunctions in mechanical components or electrical drives, based upon the technical documentation.
7106.D2.8	Correct malfunctions where possible, or correctly identify the expertise required to correct a malfunction.

7106.D2.9	Transfer the knowledge learned from one system to another system.
7106.D2.10	Effectively use current and emerging computer technologies when applicable.
7106.D2.11	Demonstrate ability to read and interpret technical documents.
7106.D2.12	Demonstrate the ability to use various types of software applicable to course.

Industrial Automation and Robotics Capstone		
Career Cluster	Advanced Manufacturing	
Program of Study	Industrial Automation and Robotics	
NLPS Sequence	D	
Course Code	7224	
Course Description	*The Industrial Automation and Robotics Capstone focuses on the installation, maintenance, and repair of industrial robots. Students will also learn the basics of pneumatic, electro-pneumatic and hydraulic control circuits as well as the basic theory, fundamentals of digital logic, and programming of programmable logic controllers (PLCs) in a complex mechatronic system. Students will learn to identify malfunctioning robots and to apply troubleshooting strategies to identify and localize problems caused by pneumatic and hydraulic control circuits and PLC hardware. Completing the capstone course will provide students the opportunity to earn a postsecondary certificate and will prepare students to take nationally recognized industry certification exams. Hands-on projects and team activities will allow students to apply learning on the latest industry technologies. Extended work-based learning experiences and industry partnerships are highly encouraged for an authentic industry experience.*	
Prerequisite(s)/ Corequisite(s)	Principles of Advanced Manufacturing (7108) **AND** Advanced Manufacturing Technology (7103) **OR** Principles of Industry 4.0 – Smart Manufacturing (7220) **AND** Robotics Design and Innovation (4728); Mechatronics Systems (7106)	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial ArtsK-12	
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Manufacturing 9-12	

	● Occupational Specialist I, II or III: Industrial Automation 9-12 ● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● CTE: Trade & Industrial: Industrial Repair & Maintenance ● Workplace Specialist: Engineering or Manufacturing ● Technology Education with high school setting ● Workplace Specialist: Industrial Automation & Robotics ● Workplace Specialist: Industrial Repair & Maintenance
REPA/REPA 3	● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● CTE: Trade & Industrial: Industrial Automation & Robotics 5-12 ● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● Technology Education 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12 ● Workplace Specialist: Industrial Automation & Robotics 9-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	INDT 104: Fluid Power I; INDT 203: Machine Maintenance and Installation; ADMF 222: Fluid Power II; ADMF 202: Digital Fundamentals and Siemens Automation Controllers*; INDT 205: Programmable Automation Controls I
VU Course Alignment	CIMT 125/125L (Lab): Introduction to Robotics VU-EC – CIMT 140/L (Lab): Mechanical Drives ; CIMT 150/L (Lab): Electronic and Electrical Applications for Manufacturing ; CIMT 160/L (Lab): Fluid Power Systems
Four Yr. Course Alignment	
Postsecondary Credential	ITCC -TC Automation and Robotics Technology (15.0613) VU/EC - CG Machinery Repair Assistant (15.0406)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology
Promoted Certifications	Applied PLC Technology II: Allen Bradley; Applied Robotics
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Fluid Power***
7224.D1.1	Calculate and demonstrate the basic physics of fluid mechanics using Pascal's Law.
7224.D1.2	Describe the function and construction of various fluid power components, including pumps, valves, cylinders, filters, heat exchangers, pressure regulators, and accumulators.
7224.D1.3	Identify fluid power symbols and interpret fluid power schematic diagrams.
7224.D1.4	Demonstrate basic fluid power plumbing.
7224.D1.5	Design elementary fluid power circuits.
7224.D1.6	Troubleshoot elementary fluid power circuits.
7224.D1.7	Demonstrate knowledge of safety procedures related to fluid power equipment.

7224.D1.8	Demonstrate ability to read and interpret technical documents.
7224.D1.9	Demonstrate the ability to use various types of software applicable to course.
7224.D1.10	Demonstrate proper safety precautions related to equipment.
Domain	***Machine Maintenance and Installation***
7224.D2.1	Perform the rigging and lifting of industrial components.
7224.D2.2	Describe the principles of mechanical power transmission systems.
7224.D2.3	Make speed, torque, and pitch calculations.
7224.D2.4	Explain the advantages and disadvantages of belt, gear, chain and coupling drives.
7224.D2.5	Install and align belts, gears, chains, and couplings correctly.
7224.D2.6	Describe the use and construction of seals and packings.
7224.D2.7	Recognize the differences and correct uses of plain and anti-friction type bearings.
7224.D2.8	Compare gear drive systems, their components and function.
7224.D2.9	Analyze failures due to heat, vibration, and observation.
7224.D2.10	Selection of proper lubricants for the correct use, in specific applications.
7224.D2.11	Installing and maintaining components safely.
7224.D2.12	Follow conventional industrial safety practices.
Domain	***Pressurized Systems***
7224.D3.1	Understand the hazards of electromechanical equipment and apply safe working practices.
7224.D3.2	Understand what a mechatronic system is, and the inter relationships of components and modules within a complex mechatronic system with a focus on (electro) pneumatic and hydraulic control systems.
7224.D3.3	Understand the role of (electro) pneumatic and hydraulic control systems in complex mechatronic systems and subsystems.
7224.D3.4	Understand troubleshooting, maintenance and safety issues revolving around (electro) pneumatic and hydraulic circuits within a mechatronic system.
7224.D3.5	Explain the role of various pneumatic / hydraulic components within a system or module and trace and describe the flow of energy in a given system or module.
7224.D3.6	Describe the basic physical properties of pneumatic/hydraulic components in a system and carry out measurements and adjustments on pneumatic / hydraulic components.
7224.D3.7	Read, analyze, and utilize technical documents for the pneumatic/hydraulic control system.
7224.D3.8	Localize, identify, document and correct malfunctions in complex mechatronic systems.
7224.D3.9	Transfer the knowledge learned from one system to other systems.
7224.D3.10	Effectively use current and emerging computer technologies when applicable.
Domain	***Advanced Control Systems***
7224.D4.1	Explain the role of programmable logic controllers within a given system or module.
7224.D4.2	Trace and describe the flow of information in a given mechatronic system or subsystem with a focus on the control function of PLCs in the system.
7224.D4.3	Describe the basic functions and design of PLCs.
7224.D4.4	Read, analyze, and utilize technical documents such as data sheets, timing diagrams, operation manuals, schematics, and ladder diagrams.
7224.D4.5	Correctly localize, identify, and document system malfunctions in or caused by PLC hardware, based upon the technical documentation.
7224.D4.6	Transfer the knowledge learned from one system to another system.

7224.D4.7	Effectively use current and emerging computer technologies when applicable.
7224.D4.8	Attain readiness to take Level 1 - Siemens Certified Mechatronic Systems Assistant exam.
Domain	***Programmable Logic Controllers***
7224.D5.1	Review basic computer operations.
7224.D5.2	Program from relay logic to ladder logic diagrams.
7224.D5.3	Design timer circuits and logic circuits.
7224.D5.4	Describe logic circuits.
7224.D5.5	Describe the common parts of programmable controllers.
7224.D5.6	Program a start/stop circuit using a PLC.
7224.D5.7	Program counters and timers using a programmable controller.
7224.D5.8	Install and troubleshoot a simple programmable controller system.
7224.D5.9	Discuss input and output analog signals to/ from the PLC.
7224.D5.10	Discuss sequencers.
7224.D5.11	Demonstrate ability to read and interpret technical documents.

Advanced Manufacturing Industrial Maintenance Technician – Electrical							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7108	Principles of Advanced Manufacturing	7103	Advanced Manufacturing Technology	7102	Industrial Electrical Fundamentals	7260	Industrial Electrical Capstone
7220	Principles of Industry 4.0 – Smart Manufacturing	4728	Robotics Design and Innovation				

Principles of Advanced Manufacturing		
Career Cluster	Advanced Manufacturing	
Program of Study	Industrial Automation and Robotics, Industrial Maintenance – Electrical, Industrial Maintenance – Mechanical	
NLPS Sequence	A	
Course Code	7108	
Course Description	*Principles of Advanced Manufacturing is a course that includes classroom and laboratory experiences in Industrial Technology and Manufacturing Trends. Domains include safety and impact, manufacturing essentials, lean manufacturing, design principles, and careers in advanced manufacturing. Hands-on projects and team activities will allow students to apply learning on the latest industry technologies. Work-based learning experiences and industry partnerships are highly encouraged for an authentic industry experience.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial ArtsK-12	
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12	

	● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Manufacturing 9-12 ● Occupational Specialist I, II or III: Industrial Automation 9-12 ● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● CTE: Trade & Industrial: Industrial Repair & Maintenance ● Workplace Specialist: Engineering or Manufacturing ● Technology Education with high school setting ● Workplace Specialist: Industrial Automation & Robotics ● Workplace Specialist: Industrial Repair & Maintenance
REPA/REPA 3	● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● CTE: Trade & Industrial: Industrial Automation & Robotics 5-12 ● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● Technology Education 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12 ● Workplace Specialist: Industrial Automation & Robotics 9-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ADMF 101: Key Principles of Advanced Manufacturing *OR* SMDI 110: Introduction to Industrial Internet of Things
VU Course Alignment	PMTD 110/L (Lab): Manufacturing Processes; DRAF 140: Introduction to CAD
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Automation and Robotics Technology (15.0613) VU - CG Machinery Repair Assistant (15.0406); CG Industrial Technology (15.0612)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology
Promoted Certifications	Industrial Technology Maintenance (ITM) – Level 1 – Electrical Systems
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Advanced Manufacturing***
7108.D1.1	Understand the importance of the manufacturing industry, and introduction to common manufacturing concepts through direct interaction with industry.
7108.D1.2	Conduct assigned tasks in a safe and workmanlike manner while working independently or in small groups.
7108.D1.3	Discuss the need for workplace safety and workplace safety training programs as covered by the OSHA 10 Hour program:
7108.D1.4	Attain readiness to take OSHA 10 Hour General Industry Certification exam.

7108.D1.5	Discuss quality systems and reference common manufacturing examples
7108.D1.6	Use quantitative analytical skills to evaluate and process numerical data.
7108.D1.7	Discuss basic blueprint reading fundamentals
7108.D1.8	Discuss basic measurement systems.
7108.D1.9	Perform basic measurements using precision measuring tools.
7108.D1.10	Demonstrate the ability to read and interpret technical documents.
7108.D1.11	Utilizing and applying software where appropriate to the course.
7108.D1.12	Attain readiness to take MSSC Safety and Quality Certification exam.
Domain	***Career Navigation***
7108.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7108.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7108.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7108.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7108.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7108.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7108.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7108.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7108.D4.1	Demonstrate computer literacy skills and basic computer functions.
7108.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7108.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7108.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Principles of Industry 4.0 - Smart Manufacturing	
Career Cluster	Advanced Manufacturing
Program of Study	Industry 4.0 – Smart Manufacturing; Industrial Automation and Robitics; Industrial Maintenance Electrical; Industrial Maintenance Mechanical
NLPS Sequence	A
Course Code	7220

Course Description	*Principles of Industry 4.0 introduces students to the Industrial Internet of Things (IIoT). Students will explore Industry 4.0 technologies such as artificial intelligence (AI), human to robot collaboration, big data, safety, electrical, sensors, digital integration, fluid power, robot operation, measurement, CAD, CNC, additive manufacturing, print reading, and technical mathematics. Students will complete hands-on labs, virtual simulations, projects, and critical thinking assignments to help prepare for SACA C-101 Certified Industry 4.0 Associate I - Basic Operations certification exam.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Manufacturing K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II, or III: Engineering ● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Occupational Specialist I, II or III: Manufacturing 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering or Manufacturing ● Workplace Specialist: Engineering or Manufacturing 9-12	
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Industrial Automation & Robotics ● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SMDI 110: Introduction to Industrial Internet of Things	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC- CT Smart Manufacturing and Digital Integration (15.0405); TC Smart Manufacturing and Digitial Integration (15.0405)	
Liberal Arts/Sciences	ITCC- MATH 137: Trigonometry with Analytic Geometry, IVYT 11X Student Success	

Requirements	
Promoted Certifications	SACA C-101 Certified Industry 4.0 Associate I - Basic Operations
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Industry 4.0***
7220.D1.1	Identify the components of the Industrial Internet of Things (IIoT).
7220.D1.2	Recognize that IIoT is the building block for Smart Manufacturing and Digital Integration.
7220.D1.3	Recognize how equipment monitoring plays a major role in predictive maintenance, lean manufacturing, and quality.
7220.D1.4	Demonstrate how Industry 4.0 concepts are changing the manufacturing world.
7220.D1.5	Execute basic setup, adjustment & operation of automated machines that may include CNC, robotics, 3D Printers, laser engraving, etc.
7220.D1.6	Discuss multiple aspects of industrial prints/drawings that are used in manufacturing.
7220.D1.7	Demonstrate an understanding of technical math, US customary, metric system, and metrology.
7220.D1.8	Recall content pertaining to General Industrial Safety to successfully obtain the OSHA 10 Hour General Industry Certification.
7220.D1.9	Recall fundamental content to meet/exceed the cut-score for the SACA (Smart Automation Certification Alliance) C-101 Certified Industry 4.0 Associate - Basic Operations - Silver Certification.
7220.D1.10	Demonstrate skills to obtain the SACA C-101 Certified Industry 4.0 Associate - Basic Operations - Gold Certification at 100% of skill standard.
Domain	***Career Navigation***
7220.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7220.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7220.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7220.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7220.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7220.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7220.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7220.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7220.D4.1	Demonstrate computer literacy skills and basic computer functions.
7220.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and

	active listening in formal and informal settings.
7220.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7220.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Advanced Manufacturing Technology		
Career Cluster	Advanced Manufacturing	
Program of Study	Industrial Maintenance – Electrical, Industrial Maintenance – Mechanical	
NLPS Sequence	B	
Course Code	7103	
Course Description	*Advanced Manufacturing Technology introduces manufacturing processes and practices used in manufacturing environments. The course also covers key electrical principles, including current, voltage, resistance, power, inductance, capacitance, and transformers, along with basic mechanical and fluid power principles. Topics include, types of production, production materials, machining and tooling, manufacturing planning, production control, and product distribution will be covered. Students will be expected to understand the product life cycle from conception through distribution. This course also focuses on technologies used in production processes. Basic power systems, energy transfer systems, machine operation and control will be explored. This course will use lecture, lab, online simulation and programming to prepare students for Certified Production Technician Testing through Manufacturing Skill Standards Council (MSSC).*	
Prerequisite(s)/ Corequisite(s)	Principles of Advanced Manufacturing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial ArtsK-12	
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Manufacturing 9-12 ● Occupational Specialist I, II or III: Industrial Automation 9-12	

	● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● CTE: Trade & Industrial: Industrial Repair & Maintenance ● Workplace Specialist: Engineering or Manufacturing ● Technology Education with high school setting ● Workplace Specialist: Industrial Automation & Robotics ● Workplace Specialist: Industrial Repair & Maintenance
REPA/REPA 3	● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● CTE: Trade & Industrial: Industrial Automation & Robotics 5-12 ● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● Technology Education 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12 ● Workplace Specialist: Industrial Automation & Robotics 9-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ADMF 102: Technology in Advanced Manufacturing *OR* SMDI 111: Technology in Smart Manufacturing and Digital Integration; INDT 113: Industrial Electrical I
VU Course Alignment	CIMT 100/L (Lab): Electronics for Automation
Four Yr. Course Alignment	ISU - MFG 2225; MET 130 ISU - Intro to Materials, Processes, and Testing; Introduction to Engineering Technology
Postsecondary Credential	ITCC - TC Automation and Robotics Technology (15.0613) VU - CG Machinery Repair Assistant (15.0406); CPC Advanced Manufacturing Robotics & Mechatronics
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, UCC Electives 3 hours
Promoted Certifications	MSSC Certified Production Tech
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Advanced Manufacturing Technology***
7103.D1.1	Conduct assigned tasks in a safe and workmanlike manner while working either independently or in small groups
7103.D1.2	Identify basic manufacturing processes and major types of production systems.
7103.D1.3	Define common properties of industrial materials, their application, testing and enhancement
7103.D1.4	Describe the design, tooling, and production aspects of manufacturing.
7103.D1.5	Demonstrate a general knowledge of non-traditional manufacturing processes and automation.
7103.D1.6	Explain the basic concepts of electrical, hydraulic, and pneumatic power systems.
7103.D1.7	Describe and solve for basic electrical quantities such as voltage, amperage, resistance, and power.

7103.D1.8	Describe the types of basic fluid power systems used in manufacturing.
7103.D1.9	Determine fluid system properties such as pressure, flow, viscosity, and pressure drop
7103.D1.10	Identify the common types and operation of bearing, coupling, belt, and chain systems.
7103.D1.11	Identify physical principles including force, torque, simple machines, and mechanical drives.
7103.D1.12	Describe the basic concepts of machine control, machine automation, and electrical control.
7103.D1.13	Communicate effectively using listening, speaking, reading, and writing skills.
7103.D1.14	Use quantitative analytical skills to evaluate and process numerical data.
7103.D1.15	Solve problems using critical and creative thinking skills.
7103.D1.16	Utilize and apply software where appropriate to the course.
7103.D1.17	Attain readiness to take MSSC Production and Maintenance Awareness Certification exams.
7103.D1.18	Demonstrate ability to read and interpret technical documents.
7103.D1.19	Demonstrate ability to use various types of software applicable to course.
Domain	***Electrical Power***
7103.D2.1	Demonstrate proper safety precautions related to equipment.
7103.D2.2	Define the following terms: voltage, resistance, current amperage, direct current, alternating current, and power supply.
7103.D2.3	Identify electrical components and form a schematic diagram.
7103.D2.4	Identify types of electrical mechanical switches (SPDT, DPDT, etc.)
7103.D2.5	Use Ohm's Law to calculate voltage, current, and resistance problems.
7103.D2.6	Perform voltage, current, and resistance measurements using the proper measurement devices (both analog and digital meters).
7103.D2.7	Calculate voltage, current, and resistance in simple series, parallel, and series-parallel circuits.
7103.D2.8	Create a schematic drawing and complete single phase AC electrical service connections including meter bases and service panels.
7103.D2.9	Explain the basic principles and operation of transformers, resistors, capacitors, and diodes.
7103.D2.10	Describe the concepts of both DC and AC inductance and capacitance.
7103.D2.11	Calculate values for AC and DC resistive, inductive, and capacitive components.
7103.D2.12	Assemble and test laboratory exercises including building single phase AC switched circuits, and circuits using mechanical relays.
7103.D2.13	Use meters to identify and measure results of AC and DC laboratory exercises.
7103.D2.14	Demonstrate ability to read and interpret technical documents.
7103.D2.15	Demonstrate ability to use various types of software applicable to course.
7103.D3.1	Demonstrate understanding of the basic functions of PLC’s

Robotics Design and Innovation	
Career Cluster	Advanced Manufacturing
Program of Study	Industry 4.0 – Smart Manufacturing; Industrial Automation and Robotics; Industrial Maintenance Electrical; Industrial Maintenance Mechanical
NLPS Sequence	B
Course Code	4728

Course Description	*The Robotics Design and Innovation course is designed to introduce students to technology that is revolutionizing modern manufacturing and logistic centers across global markets. Students will explore careers that are related to the fourth industrial revolution and be introduced to the emerging technologies that make the manufacturing world ever changing. These technologies include; mechatronics, CAD/CAM, robots, programmable automation, cloud technologies, networking, big data and analytics. Students will design a part to be mass produced using processes such as additive and subtractive manufacturing, while utilizing lean manufacturing concepts. The course will prepare students for the SACA, C-102 Certified Industry 4.0 Associate*	
Prerequisite(s)/ Corequisite(s)	Principles of Industry 4.0 – Smart Manufacturing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Manufacturing K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II, or III: Engineering ● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Occupational Specialist I, II or III: Manufacturing 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering or Manufacturing ● Workplace Specialist: Engineering or Manufacturing 9-12	
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Industrial Automation & Robotics ● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SMDI 111: Technology in Smart Manufacturing and Digital Integration	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC- CT: Smart Manufacturing and Digital Integration (15.0405); TC: Smart Manufacturing and Digitial Integration (15.0405)	

Liberal Arts/Sciences Requirements	
Promoted Certifications	SACA C-102 Certified Industry 4.0 Associate - Advanced Operations Certification
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Safety***
4728.D1.1	Demonstrate safety hazards and application of safe work practices when working with industrial equipment and hand tools.
Domain	***Career Exploration***
4728.D2.1	Communicate an occupation one could expect to obtain, and the skills needed in the fourth industrial revolution.
Domain	***Smart Manufacturing and Digital Integration***
4728.D3.1	Differentiate between additive and subtractive manufacturing.
4728.D3.2	Execute software at an introductory level for graphical communication.
4728.D3.3	Produce a production part that utilizes advanced manufacturing processes as a team member.
4728.D3.4	Describe how components in modern manufacturing facilities work and communicate with each other.
4728.D3.5	Create a simple handling tool program using an industrial robot.
4728.D3.6	Recall fundamental content to meet/exceed the cut-score for the SACA (Smart Automation Certification Alliance) C-102 - Certified Industry 4.0 Associate II - Advanced Operations - Silver Certification.
4728.D3.7	Demonstrate skills to obtain the SACA C-102 - Certified Industry 4.0 Associate II - Advanced Operations - Gold Certification at a 100% skill standard.
4728.D3.8	Demonstrate the ability to create and interpret technical documents.
4728.D3.9	Demonstrate ability to use various types of software applicable to the course.

Industrial Electrical Fundamentals	
Career Cluster	Advanced Manufacturing
Program of Study	Industrial Maintenance – Electrical
NLPS Sequence	C
Course Code	7102
Course Description	*The Industrial Electrical Fundamentals course will introduce students to the National Electric Code and its application in designing and installing electrical circuits, selecting wiring materials and devices, and choosing wiring methods. Students will also gain a general understanding of common types of electric motors.*

Prerequisite(s)/ Corequisite(s)	Principles of Advanced Manufacturing (7108) OR Principles of Industry 4.0 – Smart Manufacturing (7220); Advanced Manufacturing Technology (7103) OR Robotics Design and Innovation (4728)	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial Arts K-12 ● Standard Trade & Industrial: Building Trades K-12	
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Occupational Specialist I, II or III: Manufacturing 9-12 ● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12	
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● CTE: Trade & Industrial: Industrial Repair & Maintenance ● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Industrial Repair & Maintenance ● Workplace Specialist: Engineering or Manufacturing ● Workplace Specialist: Industrial Technology or Industrial Electronics ● Technology Education with high school setting	
REPA/REPA 3	● CTE: Trade & Industrial: Engineering or Manufacturing 5-12 ● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● CTE: Trade & Industry: Electrician 5-12 ● Technology Education 5-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12 ● Workplace Specialist: Electrical 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	INDT 103: Motors and Motor Controls; INDT 125: Industrial Wiring Principles	
VU Course Alignment		

Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Industrial Electrical (46.0302); TC Industrial Electrical Technology (15.0612)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Motor and Motor Controls***
7102.D1.1	Demonstrate safe practices and procedures.
7102.D1.2	Identify motors used in commercial and residential applications.
7102.D1.3	Identify and describe methods for controlling motor speeds.
7102.D1.4	Appropriately select and install motors.
7102.D1.5	Demonstrate methods of starting motors utilized in industrial applications
7102.D1.6	Identify various types of motor protective devices used in industry.
7102.D1.7	Analyze ladder diagrams for motor circuits.
7102.D1.8	Diagnose and troubleshoot motors.
7102.D1.9	Identify various types of three-phase motor designs and applications.
7102.D1.10	Demonstrate methods for reversing AC and DC motors.
7102.D1.11	Explain the methods for accelerating and braking motors.
7102.D1.12	Demonstrate ability to read and interpret technical documents.
7102.D1.13	Demonstrate ability to use various types of software applicable to course.
7102.D1.14	Assess readiness to take the SACA C-202 Electric Motor Control Systems 1 Certification exam.
Domain	***Industrial Wiring***
7102.D2.1	Select appropriate device, pull, and junction boxes, and calculate NEC fill values.
7102.D2.2	Lay-out and install the common conduit types used in industrial settings.
7102.D2.3	Choose proper conductors, cables, raceways, and fittings.
7102.D2.4	Read and examine industrial electrical prints and ladder diagrams.
7102.D2.5	Splice, terminate, and specify NEC appropriate wire, conductors, and cable.
7102.D2.6	Understand and apply appropriate bonding and grounding techniques.
7102.D2.7	Specify and size appropriate overcurrent devices.
7102.D2.8	Recognize the hazards of industrial electricity and the procedures employed to guard against them
7102.D2.9	Size and install appropriate equipment for motor control centers.
7102.D2.10	Demonstrate ability to read and interpret technical documents.
7102.D2.11	Demonstrate ability to use various types of software applicable to course
7102.D2.12	Assess readiness to take the SACA C-206 Electrical System Installation 1 Certification exam.

Industrial Electrical Capstone		
Career Cluster	Advanced Manufacturing	
Program of Study	Industrial Maintenance – Electrical	
NLPS Sequence	D	
Course Code	7260	
Course Description	*The Industrial Electrical Capstone course is designed to provide an understanding of circuits using alternating current and the motor operation as well as the operation and programming of programmable logic controllers (PLC). The course will also examine the electrical components in a complex mechatronic system. This course will give each student a general understanding of common types of electric motors, extending from the small shaded pole fan motors to the large three-phase motors. This course will use lecture, lab, online simulation and programming to prepare students for the C-207 Programmable Controller Systems 1 Certification through Smart Automation Certification Alliance (SACA).*	
Prerequisite(s)/ Corequisite(s)	Principles of Advanced Manufacturing; Advanced Manufacturing Technology; Industrial Electrical Fundamentals	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial Arts K-12 ● Standard Trade & Industrial: Building Trades K-12	
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Occupational Specialist I, II or III: Manufacturing 9-12 ● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12	
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● CTE: Trade & Industrial: Industrial Repair & Maintenance ● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Industrial Repair & Maintenance ● Workplace Specialist: Engineering or Manufacturing ● Workplace Specialist: Industrial Technology or Industrial Electronics	

	● Technology Education with high school setting
REPA/REPA 3	● CTE: Trade & Industrial: Engineering or Manufacturing 5-12 ● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● CTE: Trade & Industry: Electrician 5-12 ● Technology Education 5-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12 ● Workplace Specialist: Electrical 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	INDT 204: Electrical Circuits*; INDT 205: Programmable Automation Controls I; ADMF 122: Industrial Electrical II
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Industrial Electrical (46.0302); TC Industrial Electrical Technology (15.0612)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology
Promoted Certifications	Associate Certified Electronics Technician (CET)
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Electrical Circuits***
7260.D1.1	Review of basic electrical concepts (voltage, current, resistance, reactance, and Impedance).
7260.D1.2	Demonstrate and ability to discuss and define electro-magnetism and induction.
7260.D1.3	Discuss the operation and use of DC and AC motors
7260.D1.4	Distinguish the difference between three-phase & single-phase distribution.
7260.D1.5	Describe the operation and interconnection of single and three phase transformers.
7260.D1.6	Describe the general principles of electric motor controls.
7260.D1.7	Select and install control devices that will achieve specific operations.
7260.D1.8	Troubleshoot complex circuits.
7260.D1.9	Recognize types and application circuits.
7260.D1.10	Maintain and install electrical components safely.
7260.D1.11	Demonstrate ability to read and interpret technical documents.
7260.D1.12	Demonstrate ability to use various types of software applicable to course.
Domain	***Programmable Automation Controls***
7260.D2.1	Review basic computer operations.
7260.D2.2	Program from relay logic to ladder logic diagrams.
7260.D2.3	Design timer circuits and logic circuits.
7260.D2.4	Describe logic circuits.

7260.D2.5	Describe the common parts of programmable controllers.
7260.D2.6	Program a start/stop circuit using a PLC.
7260.D2.7	Program counters and timers using a programmable controller.
7260.D2.8	Install and troubleshoot a simple programmable controller system.
7260.D2.9	Discuss input and output analog signals to/ from the PLC.
7260.D2.10	Discuss sequencers.
7260.D2.11	Assess readiness to take the SACA C-207 Programmable Controller Systems 1 Certification exam.
Domain	***Industrial Electrical II***
7260.D3.1	Understand the hazards of electromechanical equipment and apply safe working practices.
7260.D3.2	Describe the basic functions and design of a robotic mechatronic system.
7260.D3.3	Apply basic knowledge of robot physics in a mechatronics system.
7260.D3.4	Explain the role of various electrical components within a robotic mechatronic system.
7260.D3.5	Trace and describe the flow of energy and information in a robotic mechatronic system.
7260.D3.6	Describe the basic physical properties of electrical components.
7260.D3.7	Read, analyze and utilize technical documents such as data sheets, timing diagrams, operational manuals, schematics, etc. for a mechatronic system.
7260.D3.8	Carry out measurements and adjustments on electrical components/circuits in a mechatronic system.
7260.D3.9	Localize, identify, document and correct (where possible) malfunctions in electrical circuits, based upon the technical documentation.
7260.D3.10	Transfer the knowledge learned from one system to another system.
7260.D3.11	Effectively use current and emerging computer technologies when applicable.

Advanced Manufacturing Industrial Maintenance Technician – Mechanical							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7108	Principles of Advanced Manufacturing	7103	Advanced Manufacturing Technology	7104	Industrial Maintenance Fundamentals	7261	Industrial Maintenance Capstone
7220	Principles of Industry 4.0 – Smart Manufacturing	4728	Robotics Design and Innovation				

Principles of Advanced Manufacturing		
Career Cluster	Advanced Manufacturing	
Program of Study	Industrial Automation and Robotics, Industrial Maintenance – Electrical, Industrial Maintenance – Mechanical	
NLPS Sequence	A	
Course Code	7108	
Course Description	*Principles of Advanced Manufacturing is a course that includes classroom and laboratory experiences in Industrial Technology and Manufacturing Trends. Domains include safety and impact, manufacturing essentials, lean manufacturing, design principles, and careers in advanced manufacturing. Hands-on projects and team activities will allow students to apply learning on the latest industry technologies. Work-based learning experiences and industry partnerships are highly encouraged for an authentic industry experience.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial ArtsK-12	
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12	

	● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Manufacturing 9-12 ● Occupational Specialist I, II or III: Industrial Automation 9-12 ● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● CTE: Trade & Industrial: Industrial Repair & Maintenance ● Workplace Specialist: Engineering or Manufacturing ● Technology Education with high school setting ● Workplace Specialist: Industrial Automation & Robotics ● Workplace Specialist: Industrial Repair & Maintenance
REPA/REPA 3	● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● CTE: Trade & Industrial: Industrial Automation & Robotics 5-12 ● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● Technology Education 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12 ● Workplace Specialist: Industrial Automation & Robotics 9-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ADMF 101: Key Principles of Advanced Manufacturing OR SMDI 110: Introduction to Industrial Internet of Things
VU Course Alignment	PMTD 110/L (Lab): Manufacturing Processes; DRAF 140: Introduction to CAD
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Automation and Robotics Technology (15.0613) VU - CG Machinery Repair Assistant (15.0406); CG Industrial Technology (15.0612)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Advanced Manufacturing***
7108.D1.1	Understand the importance of the manufacturing industry, and introduction to common manufacturing concepts through direct interaction with industry.
7108.D1.2	Conduct assigned tasks in a safe and workmanlike manner while working independently or in small groups.
7108.D1.3	Discuss the need for workplace safety and workplace safety training programs as covered by the OSHA 10 Hour program:
7108.D1.4	Attain readiness to take OSHA 10 Hour General Industry Certification exam.

7108.D1.5	Discuss quality systems and reference common manufacturing examples
7108.D1.6	Use quantitative analytical skills to evaluate and process numerical data.
7108.D1.7	Discuss basic blueprint reading fundamentals
7108.D1.8	Discuss basic measurement systems.
7108.D1.9	Perform basic measurements using precision measuring tools.
7108.D1.10	Demonstrate the ability to read and interpret technical documents.
7108.D1.11	Utilizing and applying software where appropriate to the course.
7108.D1.12	Attain readiness to take MSSC Safety and Quality Certification exam.
Domain	***Career Navigation***
7108.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7108.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7108.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7108.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7108.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7108.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7108.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7108.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7108.D4.1	Demonstrate computer literacy skills and basic computer functions.
7108.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7108.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7108.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Principles of Industry 4.0 - Smart Manufacturing	
Career Cluster	Advanced Manufacturing
Program of Study	Industry 4.0 – Smart Manufacturing; Industrial Automation and Robitics; Industrial Maintenance Electrical; Industrial Maintenance Mechanical
NLPS Sequence	A
Course Code	7220

Course Description	*Principles of Industry 4.0 introduces students to the Industrial Internet of Things (IIoT). Students will explore Industry 4.0 technologies such as artificial intelligence (AI), human to robot collaboration, big data, safety, electrical, sensors, digital integration, fluid power, robot operation, measurement, CAD, CNC, additive manufacturing, print reading, and technical mathematics. Students will complete hands-on labs, virtual simulations, projects, and critical thinking assignments to help prepare for SACA C-101 Certified Industry 4.0 Associate I - Basic Operations certification exam.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Manufacturing K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II, or III: Engineering ● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Occupational Specialist I, II or III: Manufacturing 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering or Manufacturing ● Workplace Specialist: Engineering or Manufacturing 9-12	
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Industrial Automation & Robotics ● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SMDI 110: Introduction to Industrial Internet of Things	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC- CT Smart Manufacturing and Digital Integration (15.0405); TC Smart Manufacturing and Digitial Integration (15.0405)	
Liberal Arts/Sciences	ITCC- MATH 137: Trigonometry with Analytic Geometry, IVYT 11X Student Success	

Requirements	
Promoted Certifications	SACA C-101 Certified Industry 4.0 Associate I - Basic Operations
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Industry 4.0***
7220.D1.1	Identify the components of the Industrial Internet of Things (IIoT).
7220.D1.2	Recognize that IIoT is the building block for Smart Manufacturing and Digital Integration.
7220.D1.3	Recognize how equipment monitoring plays a major role in predictive maintenance, lean manufacturing, and quality.
7220.D1.4	Demonstrate how Industry 4.0 concepts are changing the manufacturing world.
7220.D1.5	Execute basic setup, adjustment & operation of automated machines that may include CNC, robotics, 3D Printers, laser engraving, etc.
7220.D1.6	Discuss multiple aspects of industrial prints/drawings that are used in manufacturing.
7220.D1.7	Demonstrate an understanding of technical math, US customary, metric system, and metrology.
7220.D1.8	Recall content pertaining to General Industrial Safety to successfully obtain the OSHA 10 Hour General Industry Certification.
7220.D1.9	Recall fundamental content to meet/exceed the cut-score for the SACA (Smart Automation Certification Alliance) C-101 Certified Industry 4.0 Associate - Basic Operations - Silver Certification.
7220.D1.10	Demonstrate skills to obtain the SACA C-101 Certified Industry 4.0 Associate - Basic Operations - Gold Certification at 100% of skill standard.
Domain	***Career Navigation***
7220.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7220.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7220.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7220.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7220.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7220.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7220.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7220.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7220.D4.1	Demonstrate computer literacy skills and basic computer functions.
7220.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and

	active listening in formal and informal settings.
7220.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7220.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Advanced Manufacturing Technology		
Career Cluster	Advanced Manufacturing	
Program of Study	Industrial Maintenance – Electrical, Industrial Maintenance – Mechanical	
NLPS Sequence	B	
Course Code	7103	
Course Description	*Advanced Manufacturing Technology introduces manufacturing processes and practices used in manufacturing environments. The course also covers key electrical principles, including current, voltage, resistance, power, inductance, capacitance, and transformers, along with basic mechanical and fluid power principles. Topics include, types of production, production materials, machining and tooling, manufacturing planning, production control, and product distribution will be covered. Students will be expected to understand the product life cycle from conception through distribution. This course also focuses on technologies used in production processes. Basic power systems, energy transfer systems, machine operation and control will be explored. This course will use lecture, lab, online simulation and programming to prepare students for Certified Production Technician Testing through Manufacturing Skill Standards Council (MSSC).*	
Prerequisite(s)/ Corequisite(s)	Principles of Advanced Manufacturing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Manufacturing K-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial ArtsK-12	
Rules 46-47	● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III: Manufacturing 9-12 ● Occupational Specialist I, II or III: Industrial Automation 9-12	

	● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12
Rules 2002	● CTE: Trade & Industrial: Engineering or Manufacturing ● CTE: Trade & Industrial: Industrial Repair & Maintenance ● Workplace Specialist: Engineering or Manufacturing ● Technology Education with high school setting ● Workplace Specialist: Industrial Automation & Robotics ● Workplace Specialist: Industrial Repair & Maintenance
REPA/REPA 3	● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● CTE: Trade & Industrial: Industrial Automation & Robotics 5-12 ● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● Technology Education 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12 ● Workplace Specialist: Industrial Automation & Robotics 9-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ADMF 102: Technology in Advanced Manufacturing OR SMDI 111: Technology in Smart Manufacturing and Digital Integration; INDT 113: Industrial Electrical I
VU Course Alignment	CIMT 100/L (Lab): Electronics for Automation
Four Yr. Course Alignment	ISU - MFG 2225; MET 130 ISU - Intro to Materials, Processes, and Testing; Introduction to Engineering Technology
Postsecondary Credential	ITCC - TC Automation and Robotics Technology (15.0613) VU - CG Machinery Repair Assistant (15.0406); CG Industrial Technology (15.0612)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, UCC Electives 3 hours
Promoted Certifications	MSSC Certified Production Tech
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Advanced Manufacturing Technology***
7103.D1.1	Conduct assigned tasks in a safe and workmanlike manner while working either independently or in small groups
7103.D1.2	Identify basic manufacturing processes and major types of production systems.
7103.D1.3	Define common properties of industrial materials, their application, testing and enhancement
7103.D1.4	Describe the design, tooling, and production aspects of manufacturing.
7103.D1.5	Demonstrate a general knowledge of non-traditional manufacturing processes and automation.
7103.D1.6	Explain the basic concepts of electrical, hydraulic, and pneumatic power systems.
7103.D1.7	Describe and solve for basic electrical quantities such as voltage, amperage, resistance, and power.
7103.D1.8	Describe the types of basic fluid power systems used in manufacturing.

7103.D1.9	Determine fluid system properties such as pressure, flow, viscosity, and pressure drop
7103.D1.10	Identify the common types and operation of bearing, coupling, belt, and chain systems.
7103.D1.11	Identify physical principles including force, torque, simple machines, and mechanical drives.
7103.D1.12	Describe the basic concepts of machine control, machine automation, and electrical control.
7103.D1.13	Communicate effectively using listening, speaking, reading, and writing skills.
7103.D1.14	Use quantitative analytical skills to evaluate and process numerical data.
7103.D1.15	Solve problems using critical and creative thinking skills.
7103.D1.16	Utilize and apply software where appropriate to the course.
7103.D1.17	Attain readiness to take MSSC Production and Maintenance Awareness Certification exams.
7103.D1.18	Demonstrate ability to read and interpret technical documents.
7103.D1.19	Demonstrate ability to use various types of software applicable to course.
Domain	***Electrical Power***
7103.D2.1	Demonstrate proper safety precautions related to equipment.
7103.D2.2	Define the following terms: voltage, resistance, current amperage, direct current, alternating current, and power supply.
7103.D2.3	Identify electrical components and form a schematic diagram.
7103.D2.4	Identify types of electrical mechanical switches (SPDT, DPDT, etc.)
7103.D2.5	Use Ohm's Law to calculate voltage, current, and resistance problems.
7103.D2.6	Perform voltage, current, and resistance measurements using the proper measurement devices (both analog and digital meters).
7103.D2.7	Calculate voltage, current, and resistance in simple series, parallel, and series-parallel circuits.
7103.D2.8	Create a schematic drawing and complete single phase AC electrical service connections including meter bases and service panels.
7103.D2.9	Explain the basic principles and operation of transformers, resistors, capacitors, and diodes.
7103.D2.10	Describe the concepts of both DC and AC inductance and capacitance.
7103.D2.11	Calculate values for AC and DC resistive, inductive, and capacitive components.
7103.D2.12	Assemble and test laboratory exercises including building single phase AC switched circuits, and circuits using mechanical relays.
7103.D2.13	Use meters to identify and measure results of AC and DC laboratory exercises.
7103.D2.14	Demonstrate ability to read and interpret technical documents.
7103.D2.15	Demonstrate ability to use various types of software applicable to course.
7103.D3.1	Demonstrate understanding of the basic functions of PLC’s

Robotics Design and Innovation	
Career Cluster	Advanced Manufacturing
Program of Study	Industry 4.0 – Smart Manufacturing; Industrial Automation and Robotics; Industrial Maintenance Electrical; Industrial Maintenance Mechanical
NLPS Sequence	B
Course Code	4728
Course	*The Robotics Design and Innovation course is designed to introduce students to technology*

Description	*that is revolutionizing modern manufacturing and logistic centers across global markets. Students will explore careers that are related to the fourth industrial revolution and be introduced to the emerging technologies that make the manufacturing world ever changing. These technologies include; mechatronics, CAD/CAM, robots, programmable automation, cloud technologies, networking, big data and analytics. Students will design a part to be mass produced using processes such as additive and subtractive manufacturing, while utilizing lean manufacturing concepts. The course will prepare students for the SACA, C-102 Certified Industry 4.0 Associate*	
Prerequisite(s)/ Corequisite(s)	Principles of Industry 4.0 – Smart Manufacturing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Manufacturing K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II, or III: Engineering ● Standard Trade & Industrial: Engineering or Manufacturing 9-12 ● Occupational Specialist I, II or III: Manufacturing 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Engineering or Manufacturing ● Workplace Specialist: Engineering or Manufacturing 9-12	
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Engineering 9-12 ● Workplace Specialist: Industrial Automation & Robotics ● CTE: Trade & Industrial Engineering or Manufacturing 5-12 ● Workplace Specialist: Advanced Manufacturing 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SMDI 111: Technology in Smart Manufacturing and Digital Integration	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC- CT: Smart Manufacturing and Digital Integration (15.0405); TC: Smart Manufacturing and Digitial Integration (15.0405)	
Liberal		

Arts/Sciences Requirements	
Promoted Certifications	SACA C-102 Certified Industry 4.0 Associate - Advanced Operations Certification

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Safety***
4728.D1.1	Demonstrate safety hazards and application of safe work practices when working with industrial equipment and hand tools.
Domain	***Career Exploration***
4728.D2.1	Communicate an occupation one could expect to obtain, and the skills needed in the fourth industrial revolution.
Domain	***Smart Manufacturing and Digital Integration***
4728.D3.1	Differentiate between additive and subtractive manufacturing.
4728.D3.2	Execute software at an introductory level for graphical communication.
4728.D3.3	Produce a production part that utilizes advanced manufacturing processes as a team member.
4728.D3.4	Describe how components in modern manufacturing facilities work and communicate with each other.
4728.D3.5	Create a simple handling tool program using an industrial robot.
4728.D3.6	Recall fundamental content to meet/exceed the cut-score for the SACA (Smart Automation Certification Alliance) C-102 - Certified Industry 4.0 Associate II - Advanced Operations - Silver Certification.
4728.D3.7	Demonstrate skills to obtain the SACA C-102 - Certified Industry 4.0 Associate II - Advanced Operations - Gold Certification at a 100% skill standard.
4728.D3.8	Demonstrate the ability to create and interpret technical documents.
4728.D3.9	Demonstrate ability to use various types of software applicable to the course.

Industrial Maintenance Fundamentals	
Career Cluster	Advanced Manufacturing
Program of Study	Industrial Maintenance – Mechanical
NLPS Sequence	C
Course Code	7104
Course Description	*Industrial Maintenance Fundamentals introduces students to fundamental Welding and Machining skills. Studentswill be introduced to basic skills in welding, cutting and brazing, and machine tooling that are applicable in a wide variety of trade professions. Specifically, students will learn safe practices in oxy-fuel and Arc welding processes along with experience in using turning, milling, and grinding applications.*

Prerequisite(s)/ Corequisite(s)	Principles of Advanced Manufacturing (7108) OR Principles of Industry 4.0 – Smart Manufacturing (7220); Advanced Manufacturing Technology (7103) OR Robotics Design and Innovation (4728)	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial Arts K-12	
Rules 46-47	● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12 ● Industrial Technology 9-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Industrial Repair & Maintenance ● Workplace Specialist: Industrial Repair & Maintenance ● Technology Education	
REPA/REPA 3	● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	INDT 114: Introductory Welding; MTTC 101: Introduction to Machining	
VU Course Alignment	WELD 160: General Welding ▾	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Industrial Mechanical (47.0303), TC Industrial Mechanical Technology (47.0303) VU - CG Machinery Repair Assistant; CPC Advanced Manufacturing Robotics & Mechatronics	
Liberal Arts/Sciences Requirements	ITCC- MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology	
Promoted Certifications	Applied Mechanical Systems/FESTO	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Welding***	
7104.D1.1	Demonstrate the proper safety procedures in oxy-fuel welding, shielded metal arc, and gas metal arc welding.	

7104.D1.2	Learn proper AWS Standard Welding Terms and Definition.
7104.D1.3	Set up and shut down an oxy-fuel station properly and safely.
7104.D1.4	Select and determine the proper oxy-fuel cutting and welding tip size for a job.
7104.D1.5	Perform stringer beads with and without filler metal with the oxy-fuel torch.
7104.D1.6	Perform butt, lap, and tee joints with OAW.
7104.D1.7	Perform soldering and brazing with oxy-fuel equipment.
7104.D1.8	Perform square cut, bevel cut and hole cut with hand-held oxy-fuel cutting torch.
7104.D1.9	Perform pad of beads on plate with SMA using E7014 electrodes.
7104.D1.10	Perform lap and tee joint weld on thin gauge steel plate with SMA using 6012/6013 electrodes.
7104.D1.11	Perform pad of beads on plate with SMA using E6010/6011 electrodes.
7104.D1.12	Perform pad of beads on plate with SMA using E7018 electrodes.
7104.D1.13	Perform stringers on plate with GMA.
7104.D1.14	Perform butt, lap and tee joint welds in flat position with the MIG (GMA) welding process.
7104.D1.15	Demonstrate ability to read and interpret technical documents.
Domain	***Precision Machining***
7104.D2.1	Demonstrate applications of machining speeds and feeds.
7104.D2.2	Interpret detail and assembly drawings of tooling and related components.
7104.D2.3	Interpret engineering data presented in graphs or charts, algebraic expressions and proportional relationships.
7104.D2.4	Demonstrate the correct use of basic hand tools, special accessories, and required testing equipment.
7104.D2.5	Perform routine preventative maintenance procedures.
7104.D2.6	Develop and utilize mathematical formulas to compute coordinates and solve machining related problems.
7104.D2.7	Solve problems and make decisions using formal process methods.
7104.D2.8	Solve mathematical problems related to machining operations.

Industrial Maintenance Capstone	
Career Cluster	Advanced Manufacturing
Program of Study	Industrial Maintenance – Mechanical
NLPS Sequence	D
Course Code	7261
Course Description	*The Industrial Maintenance Capstone course examines the procedures for the removal, repair and installation of machine components. The methods of installation, lubrication practices, and maintenance procedures for industrial machinery are analyzed. Additionally the course may cover the mechanical components and electrical drives in a complex mechatronic system. By understanding the inner workings of the complete system, students will learn and apply troubleshooting strategies to identify, localize and (where possible) to correct malfunctions. Preventive maintenance of mechanical elements and electrical drives as well as safety issues within the system will be discussed. This course will use lecture, lab, online simulation and programming to prepare students for C-210 Mechanical Power Systems I Certification through*

	Smart Automation Certification Alliance (SACA).
Prerequisite(s)/ Corequisite(s)	Principles of Advanced Manufacturing; Advanced Manufacturing Technology; Industrial Maintenance Fundamentals
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level II
Bulletin 400	● Standard Trade & Industrial: Industrial Repair & Maintenance K-12 ● Industrial Arts K-12
Rules 46-47	● Standard Trade & Industrial: Industrial Repair & Maintenance 9-12 ● Occupational Specialist I, II or III: Industrial Repair & Maintenance 9-12 ● Industrial Technology 9-12 ● Industrial Education K-12
Rules 2002	● CTE: Trade & Industrial: Industrial Repair & Maintenance ● Workplace Specialist: Industrial Repair & Maintenance ● Technology Education
REPA/REPA 3	● CTE: Trade & Industrial: Industrial Repair & Maintenance 5-12 ● Workplace Specialist: Industrial Repair & Maintenance 9-12 ● Technology Education 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	INDT 203: Machine Maintenance and Installation; ADMF 112: Mechanical Drives I; ADMF 222: Fluid Power II
VU Course Alignment	VU-EC - CIMT 140/140L (Lab): Mechanical Drives ▾ ; CIMT 150/150L (Lab): Electronic and Electrical Applications for Manufacturing ▾ ; CIMT 175/175L (Lab): Mechatronics ▾
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – TC Automation and Robotics Technology (15.0613) VU-EC - CG Machinery Repair Assistant (15.0406)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology
Promoted Certifications	Applied Fluid Power – Maintenance and Troubleshooting/FESTO SACA C-210 Mechanical Power Systems I
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Fluid Power***

7261.D1.1	Calculate and demonstrate the basic physics of fluid mechanics using Pascal's Law.
7261.D1.2	Describe function and construction of various fluid power components, including pumps, valves, cylinders, filters, heat exchangers, pressure regulators, and accumulators.
7261.D1.3	Identify fluid power symbols and interpret fluid power schematic diagrams.
7261.D1.4	Demonstrate basic fluid power plumbing.
7261.D1.5	Design elementary fluid power circuits.
7261.D1.6	Troubleshoot elementary fluid power circuits.
7261.D1.7	Demonstrate knowledge of safety procedures related to fluid power equipment.
7261.D1.8	Demonstrate ability to read and interpret technical documents.
7261.D1.9	Demonstrate ability to use various types of software applicable to course.
7261.D1.10	Demonstrate proper safety precautions related to equipment.
Domain	***Machine Maintenance and Installation***
7261.D2.1	Perform the rigging and lifting of industrial components.
7261.D2.2	Describe the principles of mechanical power transmission systems.
7261.D2.3	Make speed, torque, and pitch calculations.
7261.D2.4	Explain the advantages and disadvantages of belt, gear, chain and coupling drives.
7261.D2.5	Install and align belts, gears, chains, and couplings correctly.
7261.D2.6	Describe the use and construction of seals and packings.
7261.D2.7	Recognize the differences and correct uses of plain and anti-friction type bearings.
7261.D2.8	Compare gear drive systems, their components and function.
7261.D2.9	Analyze failures due to heat, vibration, and observation.
7261.D2.10	Selection of proper lubricants for the correct use, in specific applications.
7261.D2.11	Installing and maintaining components safely.
7261.D2.12	Follow conventional industrial safety practices.
Domain	***Pressurized Systems***
7261.D3.1	Understand the hazards of electromechanical equipment and apply safe working practices.
7261.D3.2	Understand what a mechatronic system is, and the inter relationships of components and modules within a complex mechatronic system with a focus on (electro) pneumatic and hydraulic control systems.
7261.D3.3	Understand the role of (electro) pneumatic and hydraulic control systems in complex mechatronic system and subsystems.
7261.D3.4	Understand troubleshooting, maintenance and safety issues revolving around (electro) pneumatic and hydraulic circuits within a mechatronic system.
7261.D3.5	Explain the role of various pneumatic / hydraulic components within a system or module and trace and describe the flow of energy in a given system or module.
7261.D3.6	Describe the basic physical properties of pneumatic/hydraulic components in a system and carry out measurements and adjustments on pneumatic / hydraulic components.
7261.D3.7	Read, analyze, and utilize technical documents for the pneumatic/hydraulic control system.
7261.D3.8	Localize, identify, document and correct malfunctions in complex mechatronic systems.
7261.D3.9	Transfer the knowledge learned from one system to other systems.
7261.D3.10	Effectively use current and emerging computer technologies when applicable.
Domain	***Mechanical Systems***

7261.D4.1	Understand the hazards of electromechanical equipment and apply safe working practices.
7261.D4.2	Explain the role of various mechanical components within a given system or module.
7261.D4.3	Trace and describe the flow of energy in a given mechatronic system or subsystem.
7261.D4.4	Describe the basic physical properties of mechanical components including materials, lubrication requirements, and surface properties.
7261.D4.5	Carry out adjustments on mechanical components in a mechatronic system.
7261.D4.6	Read, analyze, and utilize the technical data sheets for the mechanical components and electrical drives within a mechatronic system.
7261.D4.7	Correctly localize, identify and document causes of malfunctions in mechanical components or electrical drives, based upon the technical documentation.
7261.D4.8	Correct malfunctions where possible, or correctly identify the expertise required to correct a malfunction.
7261.D4.9	Transfer the knowledge learned from one system to another system.
7261.D4.10	Effectively use current and emerging computer technologies when applicable.
7261.D4.11	Demonstrate ability to read and interpret technical documents.
7261.D4.12	Demonstrate ability to use various types of software applicable to course.

Advanced Manufacturing Precision Machining							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7109	Principles of Precision Machining	7105	Precision Machining Fundamentals	7107	Advanced Precision Machining	7219	Precision Machining Capstone

Principles of Precision Machining		
Career Cluster	Advanced Manufacturing	
Program of Study	Precision Machining	
NLPS Sequence	A	
Course Code	7109	
Course Description	*Principles of Precision Machining will provide students with a basic understanding of the processes used to produce industrial goods. Classroom instruction and labs will focus on shop safety, measurement, layout, blueprint reading, shop math, metallurgy, basic hand tools, milling, turning, grinding, and sawing operations. This course prepares the student for the optional National Institute for Metalworking Skills (NIMS) Measurement, Materials, & Safety certification that may be required for college dual credit.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Machine Shop K-12 ● Industrial Arts 7-12	
Rules 46-47	● Standard Trade & Industrial: Machine Shop 9-12 ● Occupational Specialist I, II or III: Machine Shop 9-12 ● Industrial Education K-12 ● Industrial Technology K-12	
Rules 2002	● CTE: Trade & Industrial: Precision Machine Technology ● Workplace Specialist: Precision Machine Technology ● Technology Education with high school setting	

REPA/REPA 3	● CTE: Trade & Industrial Precision Machine Technology 5-12 ● Workplace Specialist: Precision Machining 9-12 ● Technology Education 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	MTTC 101: Introduction to Machining; MTTC 106: Print Interpretation
VU Course Alignment	PMTD 110/L (Lab): Manufacturing Processes/Manufacturing Processes Laboratory; PMTD 105: Understanding Industrial Blueprints
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Machine Tool Technology (48.0503), TC Machine Tool Technology (48.0503) VU - CG Metalworking Technology (48.0501)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, UCC Electives 12 hours
Promoted Certifications	NIMS Measurement, Materials & Safety

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Machining***
7109.D1.1	Demonstrate applications of machining speeds and feeds.
7109.D1.2	Interpret detail and assembly drawings of tooling and related components.
7109.D1.3	Interpret engineering data presented in graphs or charts, algebraic expressions and proportional relationships.
7109.D1.4	Demonstrate the correct use of basic hand tools, special accessories, and required testing equipment.
7109.D1.5	Identify the basic parts and applications of measuring and layout tools.
7109.D1.6	Identify the basic parts and functions of the 5 common machine tools
7109.D1.7	Identify and explain the application of all common cutting tools.
7109.D1.8	Identify and explain Metallurgy and heat treatment of steels
7109.D1.9	Perform routine preventative maintenance procedures.
7109.D1.10	Develop and utilize mathematical formulas to compute coordinates and solve machining related problems.
7109.D1.11	Solve problems and make decisions using formal process methods.
7109.D1.12	Solve mathematical problems related to machining operations.
Domain	***Print Interpretation***
7109.D2.1	Indicate dimensions and tolerances related to fasteners and joining requirements.
7109.D2.2	Understand detail and assembly drawings of gears and cams.
7109.D2.3	Demonstrate skills in multi-view drawings required for manufacture and repair of machinery.
7109.D2.4	Discuss detail drawings involving multi-view projections, sectional views, auxiliary views, dimensioning subassemblies, and isometric illustrations.
7109.D2.5	Interpret welding symbols and codes.

7109.D2.6	Develop and use mathematical formulas to compute coordinates and solve gearing-related problems
7109.D2.7	Apply basic knowledge of physics-mechanics to industrial related problems.
7109.D2.8	Apply tolerances, limits, and fits to meet manufacturing requirements.
7109.D2.9	Read prints, interpret drawings, and understand engineering specifications.
7109.D2.10	Think critically and independently, analyze, synthesize, and evaluate technical problems and information.
7109.D2.11	Solve problems and make decisions using formal process methods.
7109.D2.12	Solve mathematical problems related to engineering formulas.
7109.D2.13	Verbally describe and interpret data obtained from prints.
Domain	***Career Navigation***
7109.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7109.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7109.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7109.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7109.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7109.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7109.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7109.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7109.D5.1	Demonstrate computer literacy skills and basic computer functions.
7109.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7109.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7109.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Precision Machining Fundamentals	
Career Cluster	Advanced Manufacturing
Program of Study	Precision Machining
NLPS Sequence	B

Course Code	7105	
Course Description	*Precision Machining Fundamentals will build a foundation in conventional milling and turning. Students will be instructed in the classroom on topics of shop safety, theory, industrial terminology, and calculations. Lab work will consist of the setup and operation of vertical and/or horizontal milling machines and engine lathes. This course prepares the student for the optional National Institute for Metalworking Skills (NIMS) Milling I certification that may be required for college dual credit.*	
Prerequisite(s)/ Corequisite(s)	Principles of Precision Machining	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	It is recommended that Precision Machining program of study be taught in a 2-3 period block of time. VU dual credit requires that Precision Machining Fundamentals and Advanced Precision Machining be completed concurrently	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Machine Shop K-12 ● Industrial Arts 7-12	
Rules 46-47	● Standard Trade & Industrial: Machine Shop 9-12 ● Occupational Specialist I, II or III: Machine Shop 9-12 ● Industrial Education K-12 ● Industrial Technology K-12	
Rules 2002	● CTE: Trade & Industrial: Precision Machine Technology ● Workplace Specialist: Precision Machine Technology ● Technology Education with high school setting	
REPA/REPA 3	● CTE: Trade & Industrial Precision Machine Technology 5-12 ● Workplace Specialist: Precision Machining 9-12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	MTTC 102: Turning Processes I; MTTC 103: Milling Processes I	
VU Course Alignment	PMTD 120: General Machines ▾	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Machine Tool Technology (48.0503), TC Machine Tool Technology (48.0503) VU - CG Metalworking Technology (48.0501)	
Liberal	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology	

Arts/Sciences Requirements	VU - ENGL 101: English Composition I, UCC Electives 12 hours
Promoted Certifications	NIMS Milling I

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Manual Milling and Turning***
7105.D1.1	Identify, understand and practice general and machine specific safety rules and practices.
7105.D1.2	Interpret engineering data presented in graphs or charts, algebraic expressions, and proportional relationships.
7105.D1.3	Demonstrate the correct use of basic hand tools, special accessories, and required testing equipment.
7105.D1.4	Perform routine preventative maintenance procedures.
7105.D1.5	Perform linear and angular measurements using a six-inch scale, micrometers, calipers, combination set, and sine bar.
7105.D1.6	Perform layout operations using a combination set, Vernier height gage, and surface plate.
7105.D1.7	Demonstrate the understanding of the theory and function of measuring and layout tools, basic operations performed on conventional machine tools, related shop theory, shop mathematics and calculations.
Domain	***Turning Process***
7105.D2.1	Identify and demonstrate correct setup and operation of tooling applications for the conventional engine lathe.
7105.D2.2	Utilize mathematical formulas to compute coordinates and solve lathe machining related problems.
7105.D2.3	Apply feeds and speeds calculations for given material and tooling combinations.
7105.D2.4	Think critically and independently, analyze, synthesize, and evaluate technical problems and information.
Domain	***Milling Process***
7105.D3.1	Demonstrate applications of machining speeds and feeds.
7105.D3.2	Interpret detail and assembly drawings of tooling and related components.
7105.D3.3	Develop and utilize mathematical formulas to compute coordinates and solve milling machine related problems.
7105.D3.4	Perform routine preventative maintenance procedures.
7105.D3.5	Identify and demonstrate correct setup and operation of tooling applications for milling machines.
7105.D3.6	Think critically and independently, analyze, synthesize, and evaluate technical problems and information.

Advanced Precision Machining		
Career Cluster	Advanced Manufacturing	
Program of Study	Precision Machining	
NLPS Sequence	C	
Course Code	7107	
Course Description	*Advanced Precision Machining will build upon the Turning and Milling prcesses learned in Precision Machining Fundamentals and will build a foundation in abrasive process machines. Students will be instructed in the classroom on topics of shop safety, theory, industrial terminology, and calculations associated with abrasives. Lab work will consist of the setup and operation of bench grinders and surface grinders. Additionally students will be introduced to Computerized Numeric Controlled (CNC) setup, operations and programming. This course prepares the student for the optional National Institute for Metalworking Skills (NIMS) Grinding I certification that may be required for college dual credit.*	
Prerequisite(s)/ Corequisite(s)	Principles of Precision Machining; Precision Machining Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for the new diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	It is recommended that Precision Machining program of study be taught in a 2-3 period block of time. VU dual credit requires that Precision Machining Fundamentals and Advanced Precision Machining be completed concurrently	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Machine Shop K-12 ● Industrial Arts 7-12	
Rules 46-47	● Standard Trade & Industrial: Machine Shop 9-12 ● Occupational Specialist I, II or III: Machine Shop 9-12 ● Industrial Education K-12 ● Industrial Technology K-12	
Rules 2002	● CTE: Trade & Industrial: Precision Machine Technology ● Workplace Specialist: Precision Machine Technology ● Technology Education with high school setting	
REPA/REPA 3	● CTE: Trade & Industrial Precision Machine Technology 5-12 ● Workplace Specialist: Precision Machining 9-12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	MTTC 105: Abrasive Processes I; MTTC 110: Turning and Milling Processes
VU Course Alignment	PMTD 120: General Machines
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Machine Tool Technology, TC Machine Tool Technology (48.0503) VU - CG Metalworking Technology (48.0501)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, UCC Electives 12 hours
Promoted Certifications	NIMS Grinding I

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Advanced Milling and Turning***
7107.D1.1	Demonstrate knowledge of basic OSHA requirements, general shop safety, and MSDS information.
7107.D1.2	Create and interpret documentation for safety, set-up, and quality control purposes.
7107.D1.3	Utilize standard shop documents such as Job Routers, Job Process Sheets, Inspection Plans, etc.
7107.D1.4	Effectively interpret part prints or technical drawings, including GD&T, and use the information to select proper gauging and measurement tools.
7107.D1.5	Demonstrate applications of machining speeds and feeds.
7107.D1.6	Interpret detail and assembly drawings of tooling and related components.
7107.D1.7	Interpret engineering data presented in graphs or charts, algebraic expressions, and proportional relationships.
7107.D1.8	Demonstrate the correct use of basic hand tools, special accessories, and required testing equipment.
7107.D1.9	Perform routine preventative maintenance procedures.
7107.D1.10	Develop and utilize mathematical formulas to compute coordinates and solve lathe and milling machine related problems.
7107.D1.11	Apply basic knowledge of physics-mechanics to lathe and mill problems.
7107.D1.12	Apply tolerance limits and fits to meet lathe and mill machine tooling problems.
7107.D1.13	Identify and demonstrate correct setup and operation of tooling applications for the conventional engine lathe and mill.
7107.D1.14	Think critically and independently, analyze, synthesize, and evaluate technical problems and information.
Domain	***Abrasive Processes***
7107.D2.1	Demonstrate the correct use of abrasive tooling, special accessories, and required testing equipment.
7107.D2.2	Apply tolerance limits and fits to meet abrasive processing requirements.
7107.D2.3	Identify and demonstrate correct setup and operation of abrasive operations.
7107.D2.4	Solve mathematical problems related to abrasive processing operations.

Domain	*Basic CNC Programming and Operation*
7107.D3.1	Develop basic CNC programming and operating skills
7107.D3.2	Utilize CNC programming and machine tools to perform complex machining tasks
7107.D3.3	Use CNC machines to rough in parts that will be used in grinding processes.
7107.D3.4	Compare the material cost, waste, manpower, scheduling of producing a part with manual machines compared to using a CNC production method using G- and M-codes

Precision Machining Capstone		
Career Cluster	Advanced Manufacturing	
Program of Study	Precision Machining	
NLPS Sequence	D	
Course Code	7219	
Course Description	*Precision Machining Capstone is an in-depth study of skills learned in Precision Machining I, with a stronger focus on CNC setup/operation/programming. Students will be introduced to two axis CNC lathe programming and three axis CNC milling machine programming. Develops the theory of programming in the classroom with applications of the program accomplished on industry-type machines. Studies terminology of coordinates, cutter paths, angle cutting, and linear and circular interpolation. Classroom activities will concentrate on precision set-up and inspection work, as well as machine shop calculations. Students will develop skills in advanced machining and measuring parts involving tighter tolerances and more complex geometry. A continued focus on safety will also be presented.*	
Prerequisite(s)/ Corequisite(s)	Principles of Precision Machining; Precision Machining Fundamentals; Advanced Precision Machining	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for the new diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Standard Trade & Industrial: Machine Shop K-12 ● Industrial Arts 7-12	
Rules 46-47	● Standard Trade & Industrial: Machine Shop 9-12 ● Occupational Specialist I, II or III: Machine Shop 9-12 ● Industrial Education K-12 ● Industrial Technology K-12	
Rules 2002	● CTE: Trade & Industrial: Precision Machine Technology ● Workplace Specialist: Precision Machine Technology	

	● Technology Education with high school setting
REPA/REPA 3	● CTE: Trade & Industrial Precision Machine Technology 5-12 ● Workplace Specialist: Precision Machining 9-12 ● Technology Education 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	MTTC 107: CNC Setup and Operations I; MTTC 208: CNC Mill Programming; MTTC 209: CNC Lathe Programming
VU Course Alignment	VU-EC - PMTD 115: CNC Set Up and Operations ; PMTD 116: Introduction to CNC Programming
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Machine Tool Technology (48.0503), TC Machine Tool Technology (48.0503)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, UCC Electives 12 hours
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***CNC Setup and Operation***
7219.D1.1	Demonstrate a basic knowledge of OSHA requirements, chip handling, and general shop safety
7219.D1.2	Identify the components of a CNC Mill (Machining Center) and Lathe (Turning Center)
7219.D1.3	Identify and understand important documentation including job routers/process plan sheets setup sheets, and prints.
7219.D1.4	Perform machine inspections and preventative maintenance checks on CNC mills & lathes
7219.D1.5	Understand and navigate the machine control unit (MCU)
7219.D1.6	Perform safe and proper machine startup and shut down procedures
7219.D1.7	Recognize and correct machine malfunctions
7219.D1.8	Use jog controls to move the machine manually
7219.D1.9	Locate, assemble, and install the correct tooling in the tool changer/turret.
7219.D1.10	Properly install and align the appropriate work holding systems in the machine according to part documentation
7219.D1.11	Locate and set work offsets
7219.D1.12	Properly set tool offsets for each tool required in the part documentation
7219.D1.13	Load, verify, and safely execute a CNC program in automatic mode
7219.D1.14	Use manual, manual data input, and automatic operation modes.
7219.D1.15	Interpret the components of a basic CNC program
7219.D1.16	Perform basic edits of a part program
7219.D1.17	Use standard measuring and inspection tools to determine if parts are within tolerances
7219.D1.18	Apply basic Geometric Dimensioning & Tolerancing (GD&T) to part inspection.

7219.D1.19	Make tool wear adjustments to manufacture parts to specifications
Domain	***CNC Programming: Mill and Lathe***
7219.D2.1	Consistently demonstrate proper programming format and techniques for manual CNC programming to machine parts without error.
7219.D2.2	Complete appropriate documentation for safety, set-up, and quality control purposes.
7219.D2.3	Create process plans and routings for machining operations.
7219.D2.4	Choose appropriate tooling for specified material and machining operation.
7219.D2.5	Calculate proper feeds and speeds for optimal tool life, machining time, and part finish.
7219.D2.6	Understand and use the Cartesian Coordinate System
7219.D2.7	Write mill and lathe G and M code programs manually on the machine control/simulator/PC
7219.D2.8	Verify, troubleshoot, and correct part programs and machining problems
7219.D2.9	Navigate CNC controls to run programmed parts

Advanced Manufacturing Welding Technology							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7110	Principles of Welding Technology	7111	Shielded Metal Arc Welding	7101	Gas Welding Processes	7226	Welding Technology Capstone

Principles of Welding Technology		
Career Cluster	Advanced Manufacturing	
Program of Study	Welding Technology	
NLPS Sequence	A	
Course Code	7110	
Course Description	*Principles of Welding Technology includes classroom and laboratory experiences that develop a variety of skills in oxy-fuel cutting and basic welding. This course is designed for individuals who intend to make a career as a Welder, Technician, Designer, Researcher, or Engineer. Emphasis is placed on safety at all times. OSHA standards and guidelines endorsed by the American Welding Society (AWS) are used. Instructional activities emphasize properties of metals, safety issues, blueprint reading, electrical principles, welding symbols, and mechanical drawing through projects and exercises that teach students how to weld and be prepared for postsecondary and career success.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Welding & Cutting K-12	
Rules 46-47	● Standard Trade & Industrial: Welding & Cutting 9-12 ● Occupational Specialist I, II or III: Welding & Cutting 9-1	
Rules 2002	● CTE: Trade & Industrial: Welding Technology ● Workplace Specialist: Welding Technology	
REPA/REPA 3	● CTE: Trade & Industrial Welding 5-12	

	● Workplace Specialist: Welding 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	WELD 100: Welding Fundamentals
VU Course Alignment	WELD 160: General Welding ; WELD 107: Industrial Blueprint Reading for Welding
Four Yr. Course Alignment	
Postsecondary Credential	ITCC- CT Structural Welding (48.0508); TC Welding Technology (48.0508) VU- CG Welding Technology (48.0508)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I; MATH 100-level or higher; UCC Social Science or Speech Elective
Promoted Certifications	AWS Sense Core; AWS SENSE: Entry Level Welder
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Welding Fundamentals***
7110.D1.1	Understand and identify welding symbols and blueprints.
7110.D1.2	Discuss the need for workplace safety and workplace safety training programs as covered by the OSHA 10 Hour program
7110.D1.3	Demonstrate basic welding techniques using virtual welding simulator.
7110.D1.4	Learn proper AWS Standard Welding Terms and Definitions.
7110.D1.5	Effectively analyze and apply Metallurgy fundamentals to welding processes.
7110.D1.6	Identify the five basic welding joints.
7110.D1.7	Understand and identify welding defects and discontinuities.
7110.D1.8	Understand how to interpret Weld Procedure Specifications (WPSs) and their purpose.
7110.D1.9	Demonstrate the use of oxy fuel welding and cutting.
7110.D1.10	Demonstrate the use of plasma arc cutting.
7110.D1.11	Discuss the current trends and opportunities in the welding field.
7110.D1.12	Attain readiness to take OSHA 10 Hour General Industry Certification exam
7110.D1.13	Demonstrate ability to read and interpret technical documents. Apply that knowledge to steel fabrication.
7110.D1.14	Utilize welding symbols to make appropriate welds according to code.
7110.D1.15	Understand the basic concepts of sketching and drawing blueprints.
7110.D1.16	Understand and apply welding symbol terminology and theory to industry applications
7110.D1.17	Demonstrate ability to use various types of software applicable to course.
Domain	***Plasma Arc Cutting***
7110.D2.1	Understand and apply learned skills to be able to operate CNC plasma cutting equipment
7110.D2.2	Use CAD software to design parts
7110.D2.3	Perform basic maintenance on all required equipment
7110.D2.4	Utilize equipment to its full capability

7110.D2.5	Use proper terminology as it applies to Plasma Arc Cutting
7110.D2.6	Show they understand safe work practices
7110.D2.7	Apply learned skills to cut and fabricate a project
Domain	***Career Navigation***
7110.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7110.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7110.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7110.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7110.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7110.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7110.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7110.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7110.D5.1	Demonstrate computer literacy skills and basic computer functions.
7110.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7110.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7110.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Shielded Metal Arc Welding	
Career Cluster	Advanced Manufacturing
Program of Study	Welding Technology
NLPS Sequence	B
Course Code	7111
Course Description	*Shielded Metal Arc Welding involves the theory and application of the Shielded Metal Arc Welding process. Process theory will include basic electricity, power sources, electrode selection, and all aspects pertaining to equipment operation and maintenance. Laboratory welds will be performed in basic weld joints with a variety of electrodes in the flat, horizontal and vertical positions. Emphasis will be placed on developing the basic skills necessary to comply with AWS industry standards.*

Prerequisite(s)/ Corequisite(s)	Principles of Welding Technology	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Welding & Cutting K-12	
Rules 46-47	● Standard Trade & Industrial: Welding & Cutting 9-12 ● Occupational Specialist I, II or III: Welding & Cutting 9-1	
Rules 2002	● CTE: Trade & Industrial: Welding Technology ● Workplace Specialist: Welding Technology	
REPA/REPA 3	● CTE: Trade & Industrial Welding 5-12 ● Workplace Specialist: Welding 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	WELD 108: Shielded Metal Arc Welding I; WELD 206: Advanced Shielded Metal Arc Welding	
VU Course Alignment	WELD 102: Shielded Metal Arc Welding I	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Structural Welding (48.0508); TC Welding Technology (48.0508) VU- CG Welding Technology (48.0508)	
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I; MATH 100-level or higher; UCC Social Science or Speech Elective	
Promoted Certifications	AWS D.1.1 Shielded Metal Arc Welding; AWS Certified Welder	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Shielded Metal Arc Welding***	
7111.D1.1	Demonstrate electric welding equipment safety.	
7111.D1.2	Understand and apply all shielded metal arc welding safety rules.	
7111.D1.3	Identify the five basic welding joints.	
7111.D1.4	Identify heat input and metal distortion.	
7111.D1.5	Describe the capabilities of electric welding equipment.	
7111.D1.6	Weld with A.C. and D.C. current.	
7111.D1.7	Prepare and tack weld coupons.	

7111.D1.8	Make single and multi-pass welds.
7111.D1.9	Weld in the flat, horizontal, vertical, and the overhead position.
7111.D1.10	Identify SMAW electrodes and AWS electrode classification.
7111.D1.11	Describe D.C. straight and reverse polarity.
7111.D1.12	Describe proper electrode manipulation for each type of electrode.
7111.D1.13	Describe proper correct technique for each welding position and electrode type.
7111.D1.14	Demonstrate ability to read and interpret technical documents.
7111.D1.15	Demonstrate ability to use various types of software applicable to course.
Domain	***Advanced Shielded Metal Arc Welding***
7111.D2.1	Describe differences in currents and polarities; AC, DC Reverse and DC Straight.
7111.D2.2	Explain how to safely use SMAW equipment.
7111.D2.3	Describe the AWS electrode identification system for SMA process.
7111.D2.4	Perform fillet welds on .5” to 1"plate (21-bead multi-pass) in horizontal, vertical, .3and overhead positions.
7111.D2.5	Describe how to control magnetic arc blow in DC welding of groove welds.
7111.D2.6	Prepare and tack groove welds as to AWS D1.1 Structural Steel Code.
7111.D2.7	Perform 3/8"and 1" groove welds as per AWS and ASME Code, in all positions.
7111.D2.8	Perform air carbon arc gouging on steel groove welds.
7111.D2.9	Describe heat input and metal warpage and distortion.
7111.D2.10	Describe methods of destructive and non-destructive testing.
7111.D2.11	Attain readiness to take American Welding Society certification exam
7111.D2.12	Demonstrate ability to read and interpret technical documents.
7111.D2.13	Demonstrate ability to use various types of software applicable to course.

Gas Welding Processes	
Career Cluster	Advanced Manufacturing
Program of Study	Welding Technology
NLPS Sequence	C
Course Code	7101
Course Description	*Gas Welding Processes is designed to cover the operation of Gas Metal Arc Welding (MIG) equipment. This will include all settings, adjustments and maintenance needed to weld with a wire feed system. Instruction on both short-arc and spray-arc transfer methods will be covered. Tee, lap, and open groove joints will be done in all positions with solid, fluxcore, and aluminum wire. Test plates will be made for progress evaluation. Schools may choose to offer the course as a comprehensive MIG Welding course or a combination of introductory MIG and TIG Welding operations.*
Prerequisite(s)/ Corequisite(s)	Principles of Welding Technology
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum

Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes	Schools may choose to cover both introductory MIG and TIG Welding. This configuration is available for dual credit through ITCC.	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Welding & Cutting K-12	
Rules 46-47	● Standard Trade & Industrial: Welding & Cutting 9-12 ● Occupational Specialist I, II or III: Welding & Cutting 9-1	
Rules 2002	● CTE: Trade & Industrial: Welding Technology ● Workplace Specialist: Welding Technology	
REPA/REPA 3	● CTE: Trade & Industrial Welding 5-12 ● Workplace Specialist: Welding 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	WELD 207: Gas Metal Arc (MIG) Welding; WELD 272: Advanced Gas Metal (MIG) Welding II	
VU Course Alignment	WELD 103: Gas Metal Arc Welding	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Structural Welding (48.0508); TC Welding Technology (48.0508) VU - CG Welding Technology (48.0508)	
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I; MATH 100-level or higher; UCC Social Science or Speech Elective	
Promoted Certifications	AWS D.1.1 MIG, AWS Sense Entry Level Welder; AWS SENSE: Advanced Level Welder	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Gas Metal Arc Welding***	
7101.D1.1	Employ safety practices involved in gas metal arc welding.	
7101.D1.2	Describe constant voltage and wire feed welding processes.	
7101.D1.3	Weld with hard wire using short circuit and spray method welding.	
7101.D1.4	Weld with flux-core tubular wires.	
7101.D1.5	Weld aluminum with spray.	
7101.D1.6	Identify the gases used in gas metal arc welding.	
7101.D1.7	Perform routine maintenance on gas metal arc welding equipment.	
7101.D1.8	Identify and weld five (5) basic types of joints.	
7101.D1.9	Demonstrate ability to read and interpret technical documents.	
7101.D1.10	Demonstrate ability to use various types of software applicable to course.	

Domain	Advanced Gas Metal Arc Welding
7101.D2.1	Demonstrate the proper safety procedures in Gas Metal Arc welding.
7101.D2.2	Learn proper AWS Standard Welding Terms and Definition.
7101.D2.3	Perform weld restarts that are smooth and even with GMAW using short circuiting transfer equipment on mild steel.
7101.D2.4	Perform lap and tee joint welds with GMAW using short circuiting transfer equipment on mild steel in the vertical up, vertical down and overhead position.
7101.D2.5	Perform square groove welds with GMAW using short circuiting transfer equipment on mild steel in the vertical up, vertical down and overhead position.
7101.D2.6	Perform lap and tee joint welds with GMAW using spray equipment on thick mild steel in the flat and horizontal position.
7101.D2.7	Perform V-Groove welds with GMAW using spray equipment on thick mild steel in the flat position.
7101.D2.8	Perform lap, tee, and groove welds with GMAW equipment on aluminum.
7101.D2.9	Understand welding procedure specifications (WPS) and be able to follow them.
7101.D2.10	Understand the basic metallurgical properties of steel and aluminum and how they are affected by welding.
7101.D2.11	Understand the significance of the suffix in GMAW electrode selection.
7101.D2.12	Prepare to create a workmanship sample weldment for GMAW following the AWS provided prints.
7101.D2.13	Gain insight into the Certification for AWS welders
7101.D2.14	Attain readiness to take American Welding Society certification exam
7101.D2.15	Demonstrate ability to read and interpret technical documents.
7101.D2.16	Demonstrate ability to use various types of software applicable to course.

Welding Technology Capstone	
Career Cluster	Advanced Manufacturing
Program of Study	Welding Technology
NLPS Sequence	D
Course Code	7226
Course Description	*The Welding Technology Capstone course builds upon the knowledge and skills developed in Welding Fundamentals, Shielded Metal Arc Welding, and Gas Metal Arc Welding by developing advanced welding skills in Gas Tungsten Arc Welding (TIG), Pipe Welding, and Fabrication. As a capstone course, students should have the opportunity to apply their knowledge and use skills through an intensive work-based learning experience.*
Prerequisite(s)/ Corequisite(s)	Principles of Welding Technology; Shielded Metal Arc Welding; Gas Welding Processes
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	

Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Standard Trade & Industrial: Welding & Cutting K-12	
Rules 46-47	● Standard Trade & Industrial: Welding & Cutting 9-12 ● Occupational Specialist I, II or III: Welding & Cutting 9-1	
Rules 2002	● CTE: Trade & Industrial: Welding Technology ● Workplace Specialist: Welding Technology	
REPA/REPA 3	● CTE: Trade & Industrial Welding 5-12 ● Workplace Specialist: Welding 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	WELD 208: Gas Tungsten Arc (TIG) Welding; WELD 273: Advanced Gas Tungsten Arc Welding II; WELD 203: Pipe Welding I*; WELD 210: Welding Fabrication I*	
VU Course Alignment	VU-EC - WELD 105: Shielded Metal Arc Welding II ▾ ; WELD 106: Welding Certification Review ▾	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Structural Welding (48.0508); TC Welding Technology (48.0508) VU-EC - CG Welding Technology (48.0508)	
Liberal Arts/Sciences Requirements	ITCC- MATH 122: Applied Technical Mathematics; IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I; MATH 100-level or higher; UCC Social Science or Speech Elective	
Promoted Certifications	AWS D.1.1 SMAW	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Gas Tungsten Arc Welding***
7226.D1.1	Interpret welding symbols and demonstrate how they apply to shop drawings.
7226.D1.2	Identify the various joint configurations and explain how they affect weld strength.
7226.D1.3	Employ and practice safety procedures and practices used in the welding industry.
7226.D1.4	Identify and describe the function of each component of a GTAW station.
7226.D1.5	Identify and specify GTAW electrodes using the AWS electrode classification system.
7226.D1.6	Identify and specify GTAW filler metals using the AWS filler metal classification system.
7226.D1.7	Explain the effects of DCEN, DCEP, and AC current on electrode life, surface cleaning, and weld characteristics.
7226.D1.8	Describe the shielding gases used for GTAW, describe their characteristics and their uses.
7226.D1.9	Select the proper power source, current type, shielding gas, flow rate, electrode type and diameter, nozzle size, and filler metal.

7226.D1.10	Properly assemble and adjust all variables required to produce acceptable GTA welds.
7226.D1.11	Properly prepare tungsten electrodes for welding with AC or DC current.
7226.D1.12	Demonstrate the use of square wave and pulse welding technology and how it applies to GTAW.
7226.D1.13	Properly prepare metals for welding.
7226.D1.14	Identify different types of weld defects and describe steps to prevent them.
7226.D1.15	Describe welding characteristics for Mild Steel, Stainless Steel, and Aluminum and other weldable metals.
7226.D1.16	Demonstrate welding on various types of metals.
Domain	***Advanced Gas Tungsten Arc Welding***
7226.D2.1	Demonstrate the proper safety procedures in Gas Tungsten Arc welding.
7226.D2.2	Learn proper AWS Standard Welding Terms and Definition.
7226.D2.3	Set up and shut down a Gas Tungsten Arc station properly and safely.
7226.D2.4	Select and determine the proper electrode and nozzle size for a job.
7226.D2.5	Understand welding procedure specifications (WPS) and be able to follow them.
7226.D2.6	Perform destruction testing with appropriate welds.
7226.D2.7	Perform proper techniques of preparation of tungsten electrodes.
7226.D2.8	Perform balling of tungsten electrodes in preparation for aluminum welding.
7226.D2.9	Gain insight into the Certification for AWS welders.
7226.D2.10	Practice welding, following WPS and instructor's guidelines.
7226.D2.11	Lap/T/Square groove/w/wire on 10ga.steel.
7226.D2.12	Lap/T/Square groove on 10ga. Stainless Steel.
7226.D2.13	Lap/T on 10ga. Aluminum.
7226.D2.14	Workmanship sample prints; steel, stainless steel, aluminum.
7226.D2.15	Attain readiness to take American Welding Society certification exam.
7226.D2.16	Demonstrate ability to read and interpret technical documents.
Domain	***Pipe Welding***
7226.D3.1	Understand and apply all shielded metal arc pipe welding and gas tungsten arc welding safety rules.
7226.D3.2	Apply American Welding Society D1.1 code welding criteria to guided bend tests.
7226.D3.3	Utilize and apply shielded metal arc pipe welding process and gas tungsten arc welding fundamentals to pass AWS welding certifications.
7226.D3.4	Apply all appropriate equipment settings and adjustments.
7226.D3.5	Understand and apply the basic principles and terminology involved in destructive weld testing.
7226.D3.6	Employ safety procedures in preparation of and welding of pipe.
7226.D3.7	Perform the proper technique for preparing the pipe for welding.
7226.D3.8	Tack pipe in 2G and 5G position.
7226.D3.9	Weld pipe in the2G position with the stringer bead method.
7226.D3.10	Weld pipe in the 5G position with the stringer or weave bead method.
7226.D3.11	Prepare pipe for weld test.
7226.D3.12	Demonstrate ability to inspect weld joint before, during and after welding.
7226.D3.13	Demonstrate ability to read and interpret technical documents.

Domain	Fabrication
7226.D4.1	Describe equipment used in basic metal fabrication.
7226.D4.2	Use measuring equipment.
7226.D4.3	Prepare a bill of materials from a print chosen for project.
7226.D4.4	Prepare a list of fabrication steps necessary to fabricate this project.
7226.D4.5	Layout the various tolerances, fits and allowances related to this project.
7226.D4.6	Layout the assigned project.
7226.D4.7	Fabricate the assigned project.
7226.D4.8	Perform visual inspection of project.
7226.D4.9	Produce a detailed drawing of a project with welding symbols.
7226.D4.10	Demonstrate ability to read and interpret technical documents.

Agriculture

Introduction to Agriculture, Food, and Natural Resources		
Career Cluster	Agriculture	
Program of Study		
NLPS Sequence	Introductory	
Course Code	5056	
Course Description	*Introduction to Agriculture, Food and Natural Resources is a two semester course that is highly recommended as a prerequisite to and as a foundation for all other agricultural classes. Through hands-on learning activities, students are encouraged to investigate areas of agriculture. Students are introduced to the following areas of agriculture: animal science, plant and soil science, food science, horticultural science, agricultural business management, natural resources, agriculture power, structure, and technology, careers in agriculture, leadership, and supervised agricultural experience. An activity and project-based approach is used along with team building to enhance the effectiveness of the student learning activities.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes	**Note**: This course qualifies for funding at the 8th grade level	
ADDITIONAL COURSE INFO		
Funding	Introductory	Available for 8th grade
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9- 12 ● Any Standard Agriculture license ● Occupational Specialist I, II, or III in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter	
REPA/REPA 3	● CTE: Agriculture 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
5056.D1.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
5056.D1.2	Explain the benefits and responsibilities of being a member of a CTSO.
5056.D1.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5056.D1.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
5056.D2.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
5056.D2.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster.
5056.D2.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
5056.D2.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society.
5056.D2.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest.
5056.D2.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
5056.D2.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster.
Domain	***Leadership***
5056.D3.1	Students validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education.
5056.D3.2	Communicate using strategies that ensure clarity, logic, critical thinking, purpose, and professionalism in formal and informal settings
5056.D3.3	Recognize and explain the role of the FFA in the development of leadership, education,

	employability, communications, and human relations skills
5056.D3.4	Examine roles within teams, work units, departments, organizations, inter- organizational systems, and the larger environment
5056.D3.5	Acquire the communication skills necessary to positively influence others
5056.D3.6	Model characteristics of ethical and effective leaders in the workplace and community (e.g., integrity, self-awareness, self-regulation, etc.)
Domain	***Supervised Agricultural Experience***
5056.D4.1	Students validate the necessity of a Supervised Agricultural Experience (SAE) as a critical component to a well-rounded agricultural education.
5056.D4.2	Set expectations and goals related to an SAE program and explore the options
5056.D4.3	Distinguish opportunities to apply academic learning to solve problems in the workplace and community (e.g., identify how to: increase productivity, reduce costs, lower inputs, etc.)
5056.D4.4	Assess workplace/community problems and identify the most appropriate academic knowledge and skills to apply
5056.D4.5	Apply academic knowledge and skills to solve problems in the workplace/community and reflect upon the results achieved
5056.D4.6	Develop an individual SEA program and implement record keeping skills
Domain	***Plant & Soil Science***
5056.D5.1	Students connect the necessity of plant and soil science to modern agriculture.
5056.D5.2	Apply knowledge of plant classification, plant anatomy and plant physiology to the production and management of plants
5056.D5.3	Prepare and implement plant management strategies that address environmental factors, essential nutrients, and soil management practices for productive plant growth
5056.D5.4	Identify the physical qualities of the soil that determine its use
Domain	***Natural Resource***
5056.D6.1	Students confirm the importance of preserving and replenishing our natural resources through natural resource management (e.g., water, soil, air, timber, wildlife, etc.).
5056.D6.2	Explain interrelationships between natural resources and humans necessary to conduct conservation practices in natural environments
5056.D6.3	Summarize the relationship between natural resources, ecosystems, and human activity
5056.D6.4	Identify natural resources and their importance to the local community
Domain	***Animal Science***
5056.D7.1	Students explore concepts related to the modern animal science industry.
5056.D7.2	Examine the components, historical development, global implications, and future trends of the animal systems industry
5056.D7.3	Classify, evaluate, select, and manage animals based on anatomical and physiological characteristics
5056.D7.4	Examine the components of the meat industry
5056.D7.5	Identify and categorize terms and methods related to animal production (e.g., sustainable, conventional, humanely raised, natural, organic, etc.)
5056.D7.6	Examine biosecurity measures utilized to protect the welfare of animals on a local, state, national, and global level
Domain	***Agribusiness***
5056.D8.1	Students explore the basic economic principles which are used in agricultural business management and industry and how they impact the daily lives of consumers.

5056.D8.2	Define and provide examples of management skills used to organize an AFNR business (e.g., management types, organizational structures, time management techniques, conducting business agreements, etc.)
5056.D8.3	Describe the meaning, importance, and economic impact of entrepreneurship
5056.D8.4	Execute supply-and-demand principles in AFNR businesses
5056.D8.5	Recognize quality AFNR business plan components that have been developed using the SMART (specific, measurable, attainable, realistic, and timely) goals
5056.D8.6	Apply agribusiness management principles in real or simulated agribusiness systems
Domain	***Food Science***
5056.D9.1	Students apply concepts of agriculture to the various aspects of the food science and processing industry.
5056.D9.2	Examine components of the food industry
5056.D9.3	Apply principles of nutrition, biology, microbiology, chemistry, and human behavior to the development of food products and processing industry
5056.D9.4	Select and process food products for storage, distribution, and consumption
5056.D9.5	Develop and implement procedures to ensure safety, sanitation and quality in food product and processing facilities
Domain	***Biotechnology***
5056.D10.1	Students explore the use of data and scientific techniques concerning living organisms in the context of AFNR.
5056.D10.2	Examine and categorize current applications and gains achieved in applying biotechnology to agriculture
5056.D10.3	Analyze the relationship and implications of bioethics, laws, and public perceptions on applications of biotechnology in agriculture (e.g., ethical, legal, social, cultural issues)
5056.D10.4	Research and summarize the evolution of biotechnology in agriculture
Domain	***Power, Structure, and Technology***
5056.D11.1	Students establish a basic knowledge of agricultural power, structure, technology, and physical science.
5056.D11.2	Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situations
5056.D11.3	Apply technology principles in the use of agricultural technical systems
5056.D11.4	Investigate power, structure, and technological systems as they relate to the modern agriculture industry

Supervised Agriculture Experience (SAE)	
Career Cluster	Agriculture
Program of Study	
NLPS Sequence	
Course Code	5228
Course Description	*Supervised Agricultural Experience (SAE) is designed to provide students with opportunities to gain experience in the agriculture field(s) in which they are interested. Students will experience and apply what is learned in the classroom, laboratory and training site to real-life situations with a standards-based plan for learning. Students work closely with their agriculture teacher(s), parents and/or employers to get the most out of their SAE program. This course can be offered each year as well as during the summer session. Curriculum content and competencies need to be varied so that school year and summer session experiences are not duplicative.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, 1 credit per semester, 8 credits maximum
Counts Toward	
Dual Credit Status	
Additional Notes	Curriculum content and standards-based plan for learning should not be duplicated when this course is taken for multiple semesters.
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Vocational Agriculture K-12 ● Occupational Specialist in related course approved for an Agriculture pathway
Rules 46-47	● Any Standard Agriculture license ● Occupational Specialist in related course approved for an Agriculture pathway
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist in related course approved for an Agriculture pathway
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist in related course approved for an Agriculture pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary	

Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	
5228.D1.1	**Students shall be able to describe the importance of an SAE program and the benefits that can be obtained from a successful SAE program.**
5228.D1.2	Define SAE.
5228.D1.3	Summarize the reasons for having an SAE program.
5228.D1.4	Outline the benefits of a good SAE program.
5228.D1.5	Specify the criteria which must be met to qualify as an SAE program.
5228.D1.6	Evaluate the characteristics of a good SAE program.
5228.D1.7	Explain the relationship of SAE programs to the total agricultural program.
Domain	
5228.D2.1	**Students shall be able to identify the opportunities for SAE projects in the community.**
5228.D2.2	List the six major types of SAE programs.
5228.D2.3	Evaluate the characteristics of the SAE program areas.
5228.D2.4	Identify examples of projects in each program area.
5228.D2.5	Identify the resources/opportunities for SAE projects within the school, community, and home.
5228.D2.6	Describe local guidelines for the scope and nature of SAE programs.
Domain	
5228.D3.1	**Students shall be able to select goals for an SAE program.**
5228.D3.2	Explain the importance of setting goals for an SAE program.
5228.D3.3	List the types of goals which could be set for an SAE program.
5228.D3.4	Explain how goals should be set for the SAE program.
Domain	
5228.D4.1	**Students shall outline the steps that are needed to begin an SAE program.**
5228.D4.2	Evaluate personal interests for each SAE program area.
5228.D4.3	Outline how to obtain help in determining what will be needed for the SAE program.
5228.D4.4	Offer possible ways of financing the SAE program.
5228.D4.5	Describe the responsibilities involved in planning and conducting an SAE program
5228.D4.6	Write a personal annual and long-range SAE program plan.
5228.D4.7	Discuss the potential value of the selected SAE program for personal and career development.

5228.D4.8	Activate SAE program plans.
Domain	
5228.D5.1	**Students shall be able to keep the following records for their SAE programs: budgets, inventories, financial statements, receipts and expenditures.**
5228.D5.2	Explain the importance of keeping records.
5228.D5.3	Identify the necessary forms to keep in the record book.
5228.D5.4	Explain what information is included in Ownership Business Agreements and Placement Training Agreements.
5228.D5.5	Explain what a budget is and where it is used.
5228.D5.6	Identify the information necessary to budgeting.
5228.D5.7	Explain how to complete a budget for an SAE program.
5228.D5.8	Compare and contrast a budget and a cash flow summary.
5228.D5.9	Explain the importance of keeping an accurate inventory and demonstrate how to complete a beginning inventory.
5228.D5.10	Explain the beginning financial statement and demonstrate how to construct it.
5228.D5.11	Explain the methods used to record receipts and expenditures.
5228.D5.12	Demonstrate how to total receipt and expenditure pages at the end of the month.
5228.D5.13	Identify any additional records which should be kept each month and explain their purpose.
Domain	
5228.D6.1	**Students shall be able to complete the forms needed to summarize, analyze, and evaluate the SAE program.**
5228.D6.2	Identify the forms needed to summarize the year's records.
5228.D6.3	Explain how the cash flow summary is used.
5228.D6.4	Explain depreciation and how it is recorded.
5228.D6.5	Explain the importance of completing an ending inventory.
5228.D6.6	Identify the purposes of having a profit or loss statement and the information needed to complete it.
5228.D6.7	Explain how enterprises are analyzed in an SAE program
5228.D6.8	Identify where to find the information necessary to complete an SAE program summary.
5228.D6.9	Identify the forms which are used to evaluate and improve an SAE program.
5228.D6.10	Explain net worth and how does it reveal the progress of an SAE program.
5228.D6.11	Identify some points to evaluate on the financial statement.
5228.D6.12	Identify some ways to increase returns from an SAE program.
5228.D6.13	Identify the "problems" or weaknesses in the SAE program and select possible short- and long-range solutions.
5228.D6.14	Evaluate the overall quality and value of the SAE program.
5228.D6.15	Revise the long-range plan for the SAE program, as necessary.
5228.D6.16	Make appropriate decisions about expanding and/or diversifying the SAE program.

Domain	
5228.D7.1	**Students shall identify the awards that are available based on an SAE program.**
5228.D7.2	Identify the awards which may be received from an SAE program.
5228.D7.3	Identify the information needed to complete the award applications.
5228.D7.4	Identify the minimum SAE program requirements for FFA degrees.
Domain	
5228.D8.1	**Students shall develop a knowledge of job search techniques and resources available to the job seeker.**
5228.D8.2	Prepare a list of contacts for employment based on personal aptitudes, traits, abilities, and interests in relation to career choices.
5228.D8.3	Identify the factors to consider when selecting resources to locate a job.
5228.D8.4	Understand how to interpret want ads and posted job vacancy announcements.
5228.D8.5	Compare and contrast public and private employment agencies.
5228.D8.6	Discuss the services provided by employment agencies.
5228.D8.7	Explain how to use placement services for a personal job search.
Domain	
5228.D9.1	**Students shall understand the importance of the first contact in the job search.**
5228.D9.2	Identify and describe six items to be included in a resume.
5228.D9.3	List the important factors to consider when using the telephone for a job search.
5228.D9.4	Describe the important components of a resume.
5228.D9.5	Explain the use of a resume in a job search.
5228.D9.6	List the important components of a cover letter and be able to write one.
5228.D9.7	Complete sample job applications.
Domain	
5228.D10.1	**Students shall understand the fundamental requirements for keeping a job.**
5228.D10.2	Discuss the importance of interpersonal communication, appropriate dress, and self-evaluation procedures.
5228.D10.3	Discuss the concept of professional ethics.
5228.D10.4	Understand how being able to follow directions effectively relates to job survival.
5228.D10.5	Gain an understanding of the major reasons why workers are fired from their jobs.
Domain	
5228.D11.1	**Students who are juniors or seniors in Agricultural Science and Business shall have the opportunity to be placed in an Agricultural Cooperative Program related to their individual SAE's.**
5228.D11.2	Gain employment on a farm, ranch or in an agribusiness which is not owned by the student's parents or guardians.
5228.D11.3	A minimum of 15 hours per week will be required, 10 of the 15 required hours must be during the school week.

5228.D11.4	Demonstrate management skills by keeping satisfactory records.

Advanced Career & Technical Education, College Credit: Agriculture	
Career Cluster	Agriculture
Program of Study	
NLPS Sequence	
Course Code	6130
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited post-secondary institution through an adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint program of study involving a postsecondary partnership.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, may be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Vocational Agriculture K-12 ● Occupational Specialist in related course approved for an Agriculture pathway
Rules 46-47	● Any Standard Agriculture license ● Occupational Specialist in related course approved for an Agriculture pathway
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist in related course approved for an Agriculture pathway
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist in related course approved for an Agriculture pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	

Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
	Competencies dependent on enrolled postsecondary coursework.

Agriculture: Special Topics	
Career Cluster	Agriculture
Program of Study	
NLPS Sequence	
Course Code	6150
Course Description	*Agriculture: Special Topics is an extended learning experience designed to address the advancement and specialization of careers within the career cluster through the provision of a specialized course for a specific workforce need in the school's region. The learning experience is at a qualified site, and is designed to give the student the opportunity to learn and practice technical skills; while working under the direction of the appropriately licensed professional. Throughout the course, students will focus on learning about employment opportunities and obtaining the knowledge, skills and attitudes essential for success in specific occupations. Course standards and curriculum must be tailored to the specific profession, preparing students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. Participation in a related CTSO encourages the development of leadership, communication and career related skills, and opportunities for community service.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, may be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	

Funding	Pilot	
Bulletin 400	● Vocational Agriculture K-12 ● Occupational Specialist in related course approved for an Agriculture pathway	
Rules 46-47	● Any Standard Agriculture license ● Occupational Specialist in related course approved for an Agriculture pathway	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist in related course approved for an Agriculture pathway	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist in related course approved for an Agriculture pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	

Agriculture Ag Mechanical and Engineering							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7117	Principles of Agriculture	5088	Agriculture Power, Structure and Technology	7112	Agriculture Structures Fabrication and Design	7228	Agriculture Mechanization and Technology Capstone

Principles of Agriculture		
Career Cluster	Agriculture	
Program of Study	Ag Mechanical and Engineering, Agri-Science – Plants or Animals, Horticulture, Landscaping, Natural Resources, Precision Agriculture	
NLPS Sequence	A	
Course Code	7117	
Course Description	*Principles of Agriculture is a two-semester course that will cover the diversity of the agricultural industry and agribusiness concepts. Students will develop an understanding of the role of agriculture in the United States and globally. Students will explore Agriculture, Food, and Natural Resource (AFNR) systems related to the production of food, fiber and fuel and the associated health, safety and environmental management systems. Topics covered in the course range from animals, plants, food, natural resources, ag power, structures and technology, and agribusiness. Participation in FFA and Supervised Agricultural Experiences (SAE) will be an integral part of this course in order to develop leadership and career ready skills.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Occupational Specialist I, II, or III in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter	

Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Agribusiness Management ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
REPA/REPA 3	● CTE: Agriculture 9-12 ● Workplace Specialist: Agribusiness 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 100: Introduction to Agriculture; AGRI 102: Agricultural Business and Farm Management
VU Course Alignment	AGBS 101: Introduction to Agribusiness Management
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Urban Horticulture (1.0601); CT Landscaping Technician (1.0605); TC Precision Agriculture Specialist (1.0201) VU - CG Agribusiness (1.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***AFNR Systems***
7117.D1.1	Describe the role of agriculture in US and global societies through the domestication and distribution of the world's important crop and livestock species.
7117.D1.2	Recognize the diversity of AFNR systems in the US and the world.
7117.D1.3	Understand the size and productivity of farms and ranches in the US and around the world.
7117.D1.4	Understand US production systems for major grain crops, including Crop Rotation Systems, Tillage Systems, Variety Selection, and Harvest and grain storage technology.
7117.D1.5	Understand US production systems for major livestock animals.
7117.D1.6	Research, examine, and discuss issues and trends that impact AFNR systems on local, state, national and global levels.
7117.D1.7	Examine technologies and analyze their impact on AFNR systems.
Domain	***Agribusiness***
7117.D2.1	To have students develop an understanding of how economics relates to agriculture, and how economic principles are used to analyze and solve problems in agriculture and agribusiness.
7117.D2.2	To have students understand the structure of the U.S. Agriculture and how agriculture interacts with the aggregate economic system.
7117.D2.3	To have students recognize the role of producers, input suppliers, food marketing organizations, and consumers in the U.S. Agricultural economy.

7117.D2.4	Help students understand the qualities and characteristics employers in agribusiness expect in prospective employees and how students can develop those qualities and characteristics.
7117.D2.5	Describe the diversity of jobs and careers in agricultural industries in Indiana and the US.
Domain	***Safety, Health, and Environment Management Systems***
7117.D3.1	Identify and explain the implications of required regulations to maintain and improve safety, health, and environmental management systems.
7117.D3.2	Summarize the importance of safety, health, and environmental management in the workplace.
7117.D3.3	Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.
Domain	***Supervised Agriculture Experience (SAE)***
7117.D4.1	Explain the nature of and become familiar with those terms related to an SAE program.
7117.D4.2	Explore the numerous possibilities for an SAE program which a student might develop.
7117.D4.3	Develop an individual SAE program and implementation plan for record keeping skills.
Domain	***Agricultural Business and Farm Management***
7117.D5.1	Discuss the basic principles of management and decision-making as related to both farm and non-farm agribusiness.
7117.D5.2	Apply economic principles to case studies in farm and agribusiness.
7117.D5.3	Understand the major financial statements: what they report, how to interpret and use the data and how they are connected
7117.D5.4	Know the alternatives to meeting needs when resource analysis indicates the labor input in a business needs altered. Includes review of resume, interviewing and other job application skills.
7117.D5.5	Identify the best combination of resources to use relative to the enterprises selected for the operation including crop inputs, livestock inputs, machinery and equipment, and farmstead and buildings.
7117.D5.6	Know the alternatives for farm recordkeeping and analysis
7117.D5.7	The student will learn to work with others in a management team to combine a limited number of inputs (price, credit policy, advertising dollars, and quantity ordered) within given parameters to experience the outcomes (profits). Emphasis is placed on the practical application of financial statements for analysis.
Domain	***Career Navigation***
7117.D6.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7117.D6.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7117.D6.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7117.D6.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7117.D7.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7117.D7.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and

	organizations.
7117.D7.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7117.D7.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7117.D8.1	Demonstrate computer literacy skills and basic computer functions.
7117.D8.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7117.D8.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7117.D8.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Agriculture Power, Structure, and Technology		
Career Cluster	Agriculture	
Program of Study	Ag Mechanical and Engineering	
NLPS Sequence	B	
Course Code	5088	
Course Description	*Agriculture Power, Structure and Technology is a two semester, lab intensive course in which students develop an understanding of basic principles of tool selection, operation, maintenance, and management of agricultural equipment in concert with the utilization of technology. Topics covered include: safety, problem-solving/troubleshooting, electricity, plumbing, concrete, carpentry, metal technology, engines, emerging technologies, leadership development, supervised agricultural experience, and career opportunities in the area of agriculture power, structure, and technology.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Agriculture 9-12	
Rules 2002	● CTE: Agriculture with high school setting	

	● Workplace Specialist: Agriculture Education in Agriculture Mechanics
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Power, Structure & Technology 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 106: Agriculture Mechanization; AGRI 128: Agricultural Safety
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Agriculture Safety***
5088.D1.1	Explain the importance of safety in agricultural mechanics
5088.D1.2	Identify and differentiate between safe and unsafe shop and work safety practices
5088.D1.3	Describe the methods utilized to implement safe work and proper use of safety equipment practices
5088.D1.4	Identify and explain the purpose of signals and symbols in agricultural safety
5088.D1.5	Explain the importance and function of an operator's manual
5088.D1.6	Identify and explain the role that various agencies play in regulating shop safety
5088.D1.7	Locate and demonstrate the proper uses of the first aid and emergency equipment found in an agricultural shop
5088.D1.8	Develop proper safety skills to use for hand and power tools
5088.D1.9	Identify the hand and power tools utilized in agricultural power, structure, and technology
Domain	***Tools***
5088.D2.1	Display the proper techniques to employ when utilizing hand and power tools
5088.D2.2	Identify and display the correct use of measuring and marking devices
5088.D2.3	Show the correct procedures to follow when preparing to grind, sharpen, and recondition equipment and hand tools
5088.D2.4	Demonstrate a knowledge and understanding of metric to standard measurement conversions
Domain	***Electrical Technology***
5088.D3.1	Define basic electrical terminology and identify and explain the basic principles of electricity and differentiate between amps, ohms, volts, and watts
5088.D3.2	Recognize and explain schematics and construct wiring circuits

5088.D3.3	Demonstrate safe wiring practices and basic wiring skills
5088.D3.4	Show the methods used to make proper splices, connections and soldering, soldering
5088.D3.5	Explain and demonstrate the methods used to measure electrical circuits for voltage, amperage, resistance, and wattage
5088.D3.6	Solve multi-step problems to install electrical circuits, switching devices, and appliances
5088.D3.7	Justify the need to install ground-fault circuit interrupters Keep this standard as students need to know when to install one in wet locations
5088.D3.8	Explore and utilize electric motors and controls
Domain	***Mechanical Technology***
5088.D4.1	Perform mathematical calculations to determine the mechanical advantage of simple machines in AFNR related mechanical systems.
5088.D4.2	Service filtration systems and maintain fluid levels on equipment, machinery, and power units in accordance with operator's manuals.
5088.D4.3	Perform pre-operation inspections, start-up & shut-down procedures on equipment, machinery and power units as specified in owner's manuals
Domain	***Engine Technology***
5088.D5.1	Identify and explain the function and maintenance of integral engine components
5088.D5.2	Compare and contrast a 4 stroke-cycle, 2 stroke-cycle, and diesel engine
5088.D5.3	Explain and demonstrate proficiency in the use of measuring tools and test instrument
5088.D5.4	Select and use lubricants by proper classification
5088.D5.5	Understand basic fundamentals and troubleshooting for fuel, cooling, electrical, and intake and exhaust systems functions
5088.D5.6	Analyze and explain how the components of internal combustion engines interrelate during operation.
5088.D5.7	Utilize technical manuals and diagnostic tools to determine service and repair needs of spark-and-compression internal combustion engines used in AFNR power, structural and technical systems.

Agriculture Structures Fabrication and Design	
Career Cluster	Agriculture
Program of Study	Ag Mechanical and Engineering
NLPS Sequence	C
Course Code	7112
Course Description	*Agricultural Structures Fabrication and Design is a two-semester course that focuses on metal work, and agricultural structures. This course will allow students to develop skills in welding and metalworking, construction, fabrication, machine components and design while incorporating the engineering design process. Students will also cover safety topics for each area while demonstrating appropriate health and safety standards.*
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture

Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Agriculture 9-12	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Agriculture Mechanics	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Power, Structure & Technology 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Agriculture Safety***	
7112.D1.1	Describe and interpret the fundamentals of safety and health as applied to production agriculture.	
7112.D1.2	Demonstrate and promote appropriate safety and health standards to advance production agriculture.	
7112.D1.3	Create a safety minded culture while servicing, maintaining, and operating equipment to meet regulations and prevent hazards.	
7112.D1.4	Analyze factors that minimize lost income due to agricultural accidents.	
7112.D1.5	Utilize and maintain personal, general, and specific safety equipment related to agriculture.	

7112.D1.6	Research and demonstrate appropriate use of chemical pesticides and fertilizers.
Domain	***Metal Technology***
7112.D2.1	Analyze the situation and determine the best welding and cutting process to be used in metal fabrication.
7112.D2.2	Assess and select the proper electrode for use in various shielded metal arc welding situations.
7112.D2.3	Construct and/or repair metal structures and equipment using metal fabrication procedures.
7112.D2.4	Evaluate the quality of metal fabrication procedures (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.).
Domain	***Mechanical Technology***
7112.D3.1	Perform mathematical calculations to determine the mechanical advantage of simple machines in AFNR related mechanical systems.
7112.D3.2	Service filtration systems and maintain fluid levels on equipment, machinery, and power units in accordance with operator's manuals.
7112.D3.3	Perform pre-operation inspections, start-up & shut-down procedures on equipment, machinery and power units as specified in owner's manuals
7112.D3.4	Research and demonstrate appropriate use of chemical pesticides and fertilizers.
7112.D3.5	Research and demonstrate appropriate use of chemical pesticides and fertilizers.
Domain	***Construction Technology***
7112.D4.1	Apply scale measurement and dimension to develop sketches of agricultural structures.
7112.D4.2	Construct plans for agricultural structures using current technology (e.g., drafting software, computer-aided design, etc.).
7112.D4.3	Analyze a project plan to prepare a bill of materials and an estimate of material costs.
7112.D4.4	Complete a building site analysis checklist to select an ideal building site.
7112.D4.5	Calculate costs associated with the repair and replacement of wood and/or metal components an AFNR structure.
7112.D4.6	Calculate the cost of a water system in an AFNR structure (e.g., copper, PVC, etc.).
7112.D4.7	Calculate volume for concrete projects.
7112.D4.8	Assess and analyze the electrical requirements of an AFNR structure.

Agriculture Mechanization and Technology Capstone	
Career Cluster	Agriculture
Program of Study	Ag Mechanical and Engineering
NLPS Sequence	D
Course Code	7228
Course Description	*The Agriculture Mechanization and Technology Capstone course builds upon the knowledge and skills developed in the Principles, Ag Power, Structures and Technology, Agricultural Structures Fabrication and Design courses by developing advanced skills that students can apply to the field. Students enrolled in this course will participate in lab activities involving*

	agricultural equipment such as fueled power engines, electrical motors, pneumatic and hydraulic systems, etc. Students will be instructed on the operation, maintenance, repair, engineering and design of the agricultural mechanics and technology systems. As a capstone course, students should have the opportunity to apply their knowledge and use skills through an intensive work-based learning experience.
Prerequisite(s)/ Corequisite(s)	Ag Power, Structures and Technology; Ag Structures Fabrication and Design (-or- Precision Ag)
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits max
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for new diploma
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level II
Bulletin 400	● Vocational Agriculture K-12
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Agriculture 9-12
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Agriculture Mechanics
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Power, Structure & Technology 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Engineering Principles***

7228.D1.1	Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.
7228.D1.2	Apply physical science and engineering principles to assess and select energy sources for AFNR power, structural and technical systems.
7228.D1.3	Devise a strategy to incorporate the use of selected energy sources in an ANFR enterprise or business.
7228.D1.4	Apply energy benchmarking data to examine and select methods to conserve energy in AFNR structures.
7228.D1.5	Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situations.
7228.D1.6	Apply the scientific method to devise strategies to improve the efficiency of operation of AFNR related mechanical systems.
7228.D1.7	Devise and document processes to safely implement and evaluate the safe use of AFNR related tools, machinery, and equipment.
Domain	***Control, Monitoring, Geospatial, and Other Technologies***
7228.D2.1	Apply computer and other technologies (e.g., robotics, CNC, UAS, etc.) to solve problems and increase the efficiency of AFNR systems.
7228.D2.2	Solve problems and calculate changes in efficiency using computer technologies for AFNR systems.
7228.D2.3	Solve problems and evaluate changes in efficiency and create recommendations for the use of technologies in AFNR systems.
7228.D2.4	Prepare and/or use electrical drawings to design, install and troubleshoot electronic control systems in AFNR settings.
7228.D2.5	Design schematic drawings for electrical control systems used in AFNR systems.
7228.D2.6	Troubleshoot electrical control system performance problems found in AFNR power, structural and technical systems.
7228.D2.7	Develop and implement AFNR power, structural, and technical control systems using programmable logic controllers (PLC) and/or other computer-based systems.
7228.D2.8	Apply geospatial technologies to solve problems and increase the efficiency of AFNR systems.
7228.D2.9	Analyze and interpret trends in data collected utilizing geospatial technologies.
7228.D2.10	Install, maintain and service instrumentation and equipment used for precision technologies (i.e., GPS receivers, yield monitors, remote sensors, etc.) used in AFNR systems.
Domain	***Hydraulics and Pneumatics***
7228.D3.1	Analyze and interpret hydraulic and pneumatic system symbols and diagrams used in AFNR power, structural and technical systems.
7228.D3.2	Utilize speed, torque, and power measurements to calculate efficiency in power transmission systems used in AFNR power, structural and technical systems.
7228.D3.3	Assess and analyze vehicle and machinery performance related to suspension and steering systems used in AFNR power, structural and technical systems.

Agriculture Agri-Science – Plants or Animals							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7117	Principles of Agriculture	5008	Animal Science	5102	Food Science	7262	Agricultural Research Capstone
		5170	Plant and Soil Science	5070	Advanced Life Science, Animals (L)	7230	Agriculture Biotechnology
				5074	Advanced Life Science, Plants and Soils (L)		
				5072	Advanced Life Science: Foods		

Principles of Agriculture	
Career Cluster	Agriculture
Program of Study	Ag Mechanical and Engineering, Agri-Science – Plants or Animals, Horticulture, Landscaping, Natural Resources, Precision Agriculture
NLPS Sequence	A
Course Code	7117
Course Description	*Principles of Agriculture is a two-semester course that will cover the diversity of the agricultural industry and agribusiness concepts. Students will develop an understanding of the role of agriculture in the United States and globally. Students will explore Agriculture, Food, and Natural Resource (AFNR) systems related to the production of food, fiber and fuel and the associated health, safety and environmental management systems. Topics covered in the course range from animals, plants, food, natural resources, ag power, structures and technology, and agribusiness. Participation in FFA and Supervised Agricultural Experiences (SAE) will be an integral part of this course in order to develop leadership and career ready skills.*
Prerequisite(s)/ Corequisite(s)	None
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	

Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Occupational Specialist I, II, or III in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Agribusiness Management ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter	
REPA/REPA 3	● CTE: Agriculture 9-12 ● Workplace Specialist: Agribusiness 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	AGRI 100: Introduction to Agriculture; AGRI 102: Agricultural Business and Farm Management	
VU Course Alignment	AGBS 101: Introduction to Agribusiness Management	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Urban Horticulture (1.0601), CT Landscaping Technician (1.0605), TC Precision Agriculture Specialist (1.0201) VU - CG Agribusiness (1.0101)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***AFNR Systems***	
7117.D1.1	Describe the role of agriculture in US and global societies through the domestication and distribution of the world's important crop and livestock species.	
7117.D1.2	Recognize the diversity of AFNR systems in the US and the world.	
7117.D1.3	Understand the size and productivity of farms and ranches in the US and around the world.	
7117.D1.4	Understand US production systems for major grain crops, including Crop Rotation Systems, Tillage Systems, Variety Selection, and Harvest and grain storage technology.	
7117.D1.5	Understand US production systems for major livestock animals.	
7117.D1.6	Research, examine, and discuss issues and trends that impact AFNR systems on local, state, national and global levels.	
7117.D1.7	Examine technologies and analyze their impact on AFNR systems.	

Domain	***Agribusiness***
7117.D2.1	To have students develop an understanding of how economics relates to agriculture, and how economic principles are used to analyze and solve problems in agriculture and agribusiness.
7117.D2.2	To have students understand the structure of the U.S. Agriculture and how agriculture interacts with the aggregate economic system.
7117.D2.3	To have students recognize the role of producers, input suppliers, food marketing organizations, and consumers in the U.S. Agricultural economy.
7117.D2.4	Help students understand the qualities and characteristics employers in agribusiness expect in prospective employees and how students can develop those qualities and characteristics.
7117.D2.5	Describe the diversity of jobs and careers in agricultural industries in Indiana and the US.
Domain	***Safety, Health, and Environment Management Systems***
7117.D3.1	Identify and explain the implications of required regulations to maintain and improve safety, health, and environmental management systems.
7117.D3.2	Summarize the importance of safety, health, and environmental management in the workplace.
7117.D3.3	Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.
Domain	***Supervised Agriculture Experience (SAE)***
7117.D4.1	Explain the nature of and become familiar with those terms related to an SAE program.
7117.D4.2	Explore the numerous possibilities for an SAE program which a student might develop.
7117.D4.3	Develop an individual SAE program and implementation plan for record keeping skills.
Domain	***Agricultural Business and Farm Management***
7117.D5.1	Discuss the basic principles of management and decision-making as related to both farm and non-farm agribusiness.
7117.D5.2	Apply economic principles to case studies in farm and agribusiness.
7117.D5.3	Understand the major financial statements: what they report, how to interpret and use the data and how they are connected
7117.D5.4	Know the alternatives to meeting needs when resource analysis indicates the labor input in a business needs altered. Includes review of resume, interviewing and other job application skills.
7117.D5.5	Identify the best combination of resources to use relative to the enterprises selected for the operation including crop inputs, livestock inputs, machinery and equipment, and farmstead and buildings.
7117.D5.6	Know the alternatives for farm recordkeeping and analysis
7117.D5.7	The student will learn to work with others in a management team to combine a limited number of inputs (price, credit policy, advertising dollars, and quantity ordered) within given parameters to experience the outcomes (profits). Emphasis is placed on the practical application of financial statements for analysis.
Domain	***Career Navigation***
7117.D6.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7117.D6.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7117.D6.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.

7117.D6.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7117.D7.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7117.D7.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7117.D7.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7117.D7.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7117.D8.1	Demonstrate computer literacy skills and basic computer functions.
7117.D8.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7117.D8.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7117.D8.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Animal Science	
Career Cluster	Agriculture
Program of Study	Agri-Science – Plants or Animals
NLPS Sequence	B
Course Code	5008
Course Description	*Animal Science is a two-semester course that provides students with an overview of the animal agriculture industry. Students participate in a large variety of activities and laboratory work including real and simulated animal science experiences and projects. All areas that the students study may be applied to both large and small animals. Topics to be covered in the course include: history and trends in animal agriculture, laws and practices relating to animal agriculture, comparative anatomy and physiology of animals, biosecurity threats and interventions relating to animal and human safety, nutrition, reproduction, careers, leadership, and supervised agricultural experiences relating to animal agriculture.*
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Fulfills a science course requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma
Dual Credit Status	X (PCL/CTE)
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Agriculture 9-12	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Animal Science	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Animal Science 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	AGRI 103: Animal Science	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Historic and Current Trends in the Animal Systems Industry***	
5008.D1.1	Students evaluate the implications of animal origin and analyze common animal production methods from both producer and global perspectives.	
5008.D1.2	Evaluate and describe characteristics of animals that developed in response to the animal's environment and led to their domestication.	
5008.D1.3	Describe the historical and scientific developments of different animal industries and summarize the products, services and careers associated with each.	
5008.D1.4	Explain the role of animal agriculture within the food system in meeting food and nutritional security.	
5008.D1.5	Analyze the impact of animal production methods on end product qualities (e.g., price, sustainability, marketing, labeling, animal welfare, etc.)	
5008.D1.6	Calculate costs of marketing versus predicted increases in sales	
5008.D1.7	Analyze and evaluate the accuracy and effectiveness of records used in an animal system business.	
5008.D1.8	Analyze the structure of laws governing animal industries, international trade, and animal	

	production policies.
5008.D1.9	Analyze the local and global impact of sustainable animal agriculture practices on human and environmental systems.
Domain	***Animal Husbandry and Welfare***
5008.D2.1	Students demonstrate management techniques that ensure animal welfare and analyze procedures to ensure animal safety while maintaining safe animal products.
5008.D2.2	Design production plans that assure the welfare of animals and prevent abuse or mistreatment
5008.D2.3	Analyze and document animal welfare procedures used to ensure safety and maintain low stress when moving and restraining animals.
5008.D2.4	Analyze and document animal husbandry practices and their impact on animal welfare.
5008.D2.5	Utilize tools, technology, and equipment to perform animal husbandry and welfare tasks.
5008.D2.6	Analyze consumer concerns with animal production practices related to human health.
5008.D2.7	Analyze and summarize the impact of animal trace-back capabilities on producers and consumers.
Domain	***Animal Nutrition***
5008.D3.1	Students analyze the nutritional needs of animals and evaluate feed rations for effectiveness.
5008.D3.2	Differentiate between nutritional requirements of animals in different growth stages and production systems (e.g., growth, maintenance, gestation, natural, organic, etc.).
5008.D3.3	Correlate a species' nutritional needs to feedstuffs that could meet those needs.
5008.D3.4	Determine the relative nutritional value of feedstuffs by evaluating their general quality and condition.
5008.D3.5	Appraise the adequacy of feed rations using data from the analysis of feedstuffs, animal requirements and performance.
5008.D3.6	Compare and contrast methods that utilize feed additives and growth promotants with production practices that do not, (e.g., organic versus conventional production methods).
5008.D3.7	Utilize tools and equipment to perform animal nutrition tasks.
5008.D3.8	Analyze and apply information from a feed label and feeding directions to feed animals.
5008.D3.9	Analyze technologies used to provide animal nutrition and summarize their potential benefits and consequences.
Domain	***Animal Reproduction***
5008.D4.1	Students evaluate animals for reproduction, readiness and soundness and apply scientific principles to breeding programs.
5008.D4.2	Analyze the functions of major organs in the male and female reproductive systems.
5008.D4.3	Assess and describe factors that lead to reproductive maturity.
5008.D4.4	Evaluate reproductive problems that occur in animals.
5008.D4.5	Compare and contrast the use of genetically superior animals in the production of animals and animal products.
5008.D4.6	Demonstrate how to determine probability trait inheritance in animals.
5008.D4.7	Analyze how DNA analysis can detect genetic defects in breeding stock
5008.D4.8	Analyze the care needs for breeding stock in each stage of growth.
5008.D4.9	Calculate the potential economic benefits of natural versus artificial breeding methods.
5008.D4.10	Develop an understanding of artificial insemination, embryo transfer, and cloning.
5008.D4.11	Analyze the processes of major reproductive management practices, including estrous synchronization, superovulation, flushing and embryo transfer.

5008.D4.12	Compare and contrast quantitative breeding value differences between genetically superior animals and animals of average genetic value.
Domain	***Environmental Considerations of Animals***
5008.D5.1	Design animal housing, equipment, and handling facilities for the major systems of animal production.
5008.D5.2	Critique designs for an animal facility and prescribe alternative layouts and adjustments for the safe, sustainable and efficient use of the facility.
5008.D5.3	Analyze the use of modern equipment, technology and handling facility procedures and determine if they enhance the safe, economic, and sustainable production of animals.
5008.D5.4	Analyze animal facilities to determine if standards have been met.
5008.D5.5	Analyze the structure of laws pertaining to animal systems.
Domain	***Anatomy and Physiology***
5008.D6.1	Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).
5008.D6.2	Explain how animals are classified using a taxonomic classification system.
5008.D6.3	Appraise and evaluate the economic value of animals for various applications in the agriculture industry.
5008.D6.4	Analyze the visual characteristics of an animal or animal product and select correct classification terminology when referring to companion and production animals.
5008.D6.5	Apply principles of comparative anatomy and physiology to uses within various animal systems.
5008.D6.6	Analyze the functions of each animal cell structure.
5008.D6.7	Analyze the processes of meiosis and mitosis in animal growth, development, health, and reproduction.
5008.D6.8	Compare and contrast animal cells, tissues, organs, body system types and functions among animal species.
5008.D6.9	Select and train animals for specific purposes and maximum performance based on anatomy and physiology.
5008.D6.10	Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
5008.D6.11	Compare and contrast procedures to sustainably and efficiently develop an animal to reach its highest performance potential with respect to its anatomical and physiological characteristics.
5008.D6.12	Evaluate and select products from animals based on industry standards.
Domain	***Animal Health and Safety***
5008.D7.1	Students design programs to prevent animal diseases, parasites and other disorders and analyze biosecurity measures utilized to ensure animal welfare.
5008.D7.2	Describe and demonstrate the proper use and function of specific tools and technology related to animal health management.
5008.D7.3	Perform simple health-check evaluations on animals and practice basic emergency response procedures related to animals.
5008.D7.4	Identify and describe common illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites and physiological disorders.
5008.D7.5	Research and analyze data to evaluate preventive measures for controlling and limiting the spread of diseases, parasites, and disorders among animals.
5008.D7.6	Assess the safety and effectiveness of facilities and equipment used for surgical and

	nonsurgical veterinary treatments and procedures.
5008.D7.7	Analyze procedures at the local, state, and national levels to ensure biosecurity of the animal industry.
5008.D7.8	Analyze the health risk of different zoonotic diseases to humans and identify prevention methods.
Domain	***Environmental Impacts of Animal Agriculture***
5008.D8.1	Students design and evaluate environments for animals to promote animal health and husbandry.
5008.D8.2	Assess the effectiveness of methods of reducing the effects of animal agriculture on the environment.
5008.D8.3	Critique the reliability and validity of evidence presented to support claims regarding the effects of environmental conditions on animal populations and performance (e.g., population changes, emerging species, extinction, etc.).
5008.D8.4	Implement and evaluate the effectiveness of methods to ensure optimal environmental conditions for animals.
Domain	***Biotechnology in Animal Agriculture***
5008.D9.1	Investigate and explain the roles and issues of biotechnology in animal agriculture.
5008.D9.2	Research and summarize the evolution of biotechnology in animal agriculture.
5008.D9.3	Assess and summarize current work in biotechnology being done to add value to animal agriculture and society.
5008.D9.4	Distinguish between current and emerging applications of biotechnology in agriculture.
5008.D9.5	Compare and contrast the benefits and risks of biotechnology compared with alternative approaches to improving agriculture.
5008.D9.6	Assess and summarize the role and scope of agencies that regulate biotechnology.
5008.D9.7	Research and summarize public perceptions of biotechnology in agriculture.
5008.D9.8	Assess and argue the pros and cons of transgenic species.
5008.D9.9	Research genetic engineering and CRISPR procedures used in production of animal species.
5008.D9.10	Assess the benefits, risks, and opportunities associated with using biotechnology to promote animal health.
Domain	***Careers***
5008.D10.1	Students examine the scope of career opportunities in and the importance of agriculture to the economy.
5008.D10.2	Evaluate the nature and scope of animal sciences in agriculture, society, and the economy
5008.D10.3	Describe career opportunities and means to achieve those opportunities in animal sciences
5008.D10.4	Identify how key organizational structures and processes affect organizational performance and the quality of products and services
5008.D10.5	Demonstrate those qualities, attributes, and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society
Domain	***Leadership***
5008.D11.1	Students validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education.
5008.D11.2	Communicate clearly, effectively, and with reason through speaking, writing, visuals, and active listening in formal and informal settings

5008.D11.3	Recognize and explain the role of the FFA in the development of leadership, education, employability, communications, and human relations skills
5008.D11.4	Examine roles within teams, work units, departments, organizations, inter- organizational systems, and the larger environment
5008.D11.5	Acquire the skills necessary to positively influence others
5008.D11.6	Develop a skill set to enhance the positive evolution of the whole person
Domain	***Supervised Agriculture Experience***
5008.D12.1	Students validate the necessity of a Supervised Agricultural Experience (SAE) program as a critical component to a well-rounded agricultural education.
5008.D12.2	Explain the nature of and become familiar with those terms related to an SAE program
5008.D12.3	Explore the numerous possibilities for an SAE program which a student might develop
5008.D12.4	Develop an individual SAE program and implementation plan for record keeping skills

Plant and Soil Science		
Career Cluster	Agriculture	
Program of Study	Agri-Science – Plants or Animals	
NLPS Sequence	B	
Course Code	5170	
Course Description	*Plant and Soil Science a two semester course that provides students with opportunities to participate in a variety of activities including laboratory and field work. Coursework includes hands-on learning activities that encourage students to investigate areas of plant and soil science. Students are introduced to the following areas of plant and soil science: plant growth, reproduction and propagation, photosynthesis and respiration, diseases and pests of plants and their management, biotechnology, the basic components and types of soil, soil tillage, and conservation.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a science course requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Agriculture 9-12	

Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Plant & Soil Science
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Plant & Soil Science 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 105: Plant and Soil Science; AGRI 117: Soil Science
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Classifying***
5170.D1.1	Students classify agricultural plants according to taxonomy systems.
5170.D1.2	Explain systems used to classify plants
5170.D1.3	Compare, contrast, and classify agricultural plants according to the hierarchical classification system, life cycles, plant use and as monocotyledons or dicotyledons
5170.D1.4	Describe the morphological characteristics used to identify agricultural plants
Domain	***Plant Reproduction***
5170.D2.1	Students analyze the germination of seeds and plant reproduction to successfully grow and propagate plants.
5170.D2.2	Explain pollination, cross-pollination and self-pollination of flowering plants
5170.D2.3	Diagram the process of plant fertilization
5170.D2.4	Design and implement a plan to control the pollination of plants
5170.D2.5	Demonstrate planting techniques and provide favorable conditions for seed germination
5170.D2.6	Conduct tests associated with seed germination rates, viability, and vigor
Domain	***Environmental Factors***
5170.D3.1	Students evaluate the environmental factors affecting plant growth to productively cultivate plants.
5170.D3.2	Describe the effects air, temperature, and water have on plant metabolism and growth
5170.D3.3	Determine the optimal air, temperature and water conditions for plant growth
5170.D3.4	Design, implement and evaluate a plan to maintain optimal conditions for plant growth
5170.D3.5	Describe the qualities of light that affect plant growth
5170.D3.6	Describe and evaluate plant responses to light color, intensity, and duration
5170.D3.7	Students differentiate plant cell parts and functions as they apply to cell physiology and

	reproduction.
5170.D3.8	Identify structures in a typical plant cell and summarize the function of plant cell organelles
5170.D3.9	Diagram a typical plant cell and identify plant cell organelles and their functions
5170.D3.10	Compare and contrast mitosis and meiosis
Domain	***Plant Structure and Function***
5170.D4.1	Students establish knowledge of plant parts and functions to successfully cultivate plants for the food, fiber, and natural resource industry.
5170.D4.2	Identify the components, types, and functions of plant roots
5170.D4.3	Identify the components and the functions of plant stems
5170.D4.4	Describe the processes of translocation
5170.D4.5	Discuss external leaf morphology and the functions of leaves
5170.D4.6	Explain how leaves capture light energy and allow for the exchange of gases
Domain	***Energy Synthesis***
5170.D5.1	Students apply and adapt photosynthesis and respiration in plants to make decisions on plant production.
5170.D5.2	Explain the basic process of photosynthesis and its importance to life on Earth
5170.D5.3	Explain requirements necessary for photosynthesis to occur and identify the products and byproducts of photosynthesis
5170.D5.4	Distinguish between the light-dependent and light-independent reactions that occur during photosynthesis and apply the knowledge to plant management
5170.D5.5	Explain cellular respiration and its importance to plant life
5170.D5.6	Explain factors that affect cellular respiration and identify the products and byproducts of cellular respiration
Domain	***Plant Pests***
5170.D6.1	Identify types of plant pests and disorders
5170.D6.2	Identify major local weeds, insect pests and infectious and noninfectious plant diseases
5170.D6.3	Describe damage caused by plant pests and diseases
5170.D6.4	Diagram the life cycles of major plant pests and diseases
5170.D6.5	Describe pest control strategies associated with integrated pest management
5170.D6.6	Describe types of pesticide controls and modes of action
5170.D6.7	Employ pest management strategies to manage pest populations, assess the effectiveness of the plan and adjust the plan as needed
5170.D6.8	Explain risks and benefits associated with the materials and methods used in plant pest management
5170.D6.9	Evaluate environmental and consumer concerns regarding pest management strategies
Domain	***Sustainable Agriculture Systems***
5170.D7.1	Students apply principles and practices of cropping systems to plant production to recommend the ideal system for their local community.
5170.D7.2	Identify the current topics in crop production and the role those topics play in the management & production of agronomic crops
5170.D7.3	Assess the importance of long-term impacts on sustainable agriculture systems in relation to global food security
5170.D7.4	Evaluate the various methods of land preparation and seeding based on soil and plant characteristics
5170.D7.5	Research and summarize production methods focused on soil management (e.g., crop

	rotation, cover crops, etc.)
5170.D7.6	Analyze the alignment of modern technologies used in production systems (e.g., precision agriculture, gene editing technologies, etc.)
5170.D7.7	Describe sustainable agriculture practices and how they relate to conventional agricultural practices
5170.D7.8	Compare and contrast the differing management techniques related to environmental factors & their effect on plants.
5170.D7.9	Evaluate practices in support of sustainable agriculture
Domain	***Crop Fertilization***
5170.D8.1	Students connect soil nutrients and soil management to promote healthy plant growth.
5170.D8.2	Identify the essential nutrients in the soil for plant growth and development and their major functions
5170.D8.3	Calculate the content of N-P-K in a fertilizer container from information on the package and calculate the amount of nitrogen needed for an acre of a crop using a selected nitrogen source
5170.D8.4	Describe nutrient deficiency symptoms and recognize environmental causes of nutrient deficiencies
Domain	***Soil Properties***
5170.D9.1	Students analyze the physical properties of soil to determine crop selection, cropping drainage, and soil conservation.
5170.D9.2	Explain the process of soil formation through weathering
5170.D9.3	Demonstrate techniques used to identify soil types
5170.D9.4	Report examples of how humans are dependent upon soil, directly or indirectly, for their food, clothing, and shelter
5170.D9.5	Describe how the basic components and physical qualities of a soil influence its possible uses
Domain	***Soil Water***
5170.D10.1	Students evaluate soil and water relationships to encourage optimum plant growth.
5170.D10.2	Identify the categories of soil water
5170.D10.3	Discuss how soil drainage and water holding capacity can be improved
5170.D10.4	Assess the physical qualities of the soil that determine its potential for filtration of groundwater supplies and the likelihood of flooding
5170.D10.5	Describe properties of watersheds and identify the boundaries of local watersheds
Domain	***Soil Conservation Practices***
5170.D11.1	Students apply and adapt the soil conservation practices necessary to keep soil productive.
5170.D11.2	Propose management practices and cropping systems when given features and land capabilities that would help improve the usefulness of the land
5170.D11.3	Analyze effects of water and mechanical practices on erosion
5170.D11.4	Explain how the programs and services provided by conservation agencies contribute to successful soil management
5170.D11.5	Calculate soil loss using current models
5170.D11.6	Measure slope and explain the relationship between steepness of slope and erosion
Domain	***Soil Fertility and Health***
5170.D12.1	Students will connect physical, chemical, and biological properties that make up soil health to impacts on yield and water quality.
5170.D12.2	Assess and describe the short- and long- term effects production methods have on soil

5170.D12.3	Identify key indicators of soil health
5170.D12.4	Describe the biodiversity (earthworms, nematodes, and microorganisms) found in soil and the contribution to soil health
5170.D12.5	Describe factors that contribute to soil compaction and its effects on plants and productivity
5170.D12.6	Contrast pH and cation exchange capacity between different soil types
Domain	***Careers***
5170.D13.1	Students examine the scope of career opportunities in, and the importance of agriculture to the economy.
5170.D13.2	Evaluate the nature and scope of plant and soil sciences in agriculture and society, and the economy
5170.D13.3	Describe career opportunities and means to achieve those opportunities in plant and soil sciences
5170.D13.4	Identify how key organizational structures and processes affect organizational performance and the quality of products and services
5170.D13.5	Demonstrate those qualities, attributes, and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society
Domain	***Leadership***
5170.D14.1	Students validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education.
5170.D14.2	Communicate clearly, effectively, and with reason through speaking, writing, visuals, and active listening in formal and informal settings
5170.D14.3	Recognize and explain the role of the FFA in the development of leadership, education, employability, communications, and human relations skills
5170.D14.4	Examine roles within teams, work units, departments, organizations, inter- organizational systems, and the larger environment
5170.D14.5	Acquire the skills necessary to positively influence others
5170.D14.6	Develop a skill set to enhance the positive evolution of the whole person
Domain	***Supervised Agriculture Experience***
5170.D15.1	Students validate the necessity of a Supervised Agricultural Experience (SAE) program as a critical component to a well-rounded agricultural education.
5170.D15.2	Explain the nature of and become familiar with those terms related to an SAE program
5170.D15.3	Explore the numerous possibilities for an SAE program which a student might develop
5170.D15.4	Develop an individual SAE program and implementation plan for record keeping skills

Advanced Life Science, Plants and Soils (L)	
Career Cluster	Agriculture
Program of Study	Agri-Science – Plants or Animals
NLPS Sequence	C
Course Code	5074
Course	*Advanced Life Science: Plants and Soils is a two semester course that provides students with*

Description	*opportunities to participate in a variety of activities including laboratory work. Students study concepts, principles, and theories associated with plants and soils. Knowledge gained enables them to better understand the workings of agricultural and horticultural practices. They recognize how plants are classified, grow, function, and reproduce. Students explore plant genetics and the use of plants by humans. They examine plant evolution and the role of plants in ecology. Students investigate, through laboratories and fieldwork, how plants function and how soil influences plant life.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a science requirement for CORE 40 diplomas Counts as a quantitative reasoning course for CORE 40 diplomas Counts as Science Credit for new diploma Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12 ● Science/Biology 9-12 ● Workplace Specialist: Agriculture Education in Plant & Soil Science	
Rules 46-47	● Vocational Agriculture K-12 ● Any Standard Agriculture license ● Biology 9-12 ● Workplace Specialist: Agriculture Education in Plant & Soil Science	
Rules 2002	● CTE: Agriculture with high school setting ● Life Science with high school setting ● Workplace Specialist: Agriculture Education in Plant & Soil Science	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Life Science 5-12 ● Workplace Specialist: Agriculture Education in Plant & Soil Science	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	AGRI 109: Advanced Plant and Soil Science	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal		

Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Taxonomy and Classification***
5074.D1.1	Students analyze the classification of organisms to understand diversity and the roles of each plant organism.
5074.D1.2	Explain the classification of organisms based on a hierarchical taxonomy
5074.D1.3	Distinguish the five kingdoms of organisms, and more specific taxonomy of agricultural species of plants
5074.D1.4	Identify plants using a taxonomic key
5074.D1.5	Develop a detailed knowledge base in plant biology (this includes cell biology, physiology, morphology, anatomy, genetics, classification, evolution and ecology of plants)
Domain	***Molecules and Plant Cells***
5074.D2.1	Students connect basic concepts of chemistry, biochemistry, and biological functions as they relate to the field of agriculture science.
5074.D2.2	Compare and contrast molecules
5074.D2.3	Explain the concepts of monomers and polymers
5074.D2.4	Compare and contrast the different types of chemical bonds
5074.D2.5	Identify and differentiate between common groups of molecules
5074.D2.6	Compare and contrast animal, plant, and bacterial cells at the biological and chemical levels
5074.D2.7	Describe biochemistry and functions of plant cells, membranes, organelles, and cell walls
5074.D2.8	Identify and demonstrate the principles of genetic expression within a genome
5074.D2.9	Describe and compare cellular respiration in plants and animals
5074.D2.10	Evaluate the impact of photosynthesis and cellular respiration and the factors that affect them on plant management, culture and production problems.
Domain	***Development and Function of Plant Systems***
5074.D3.1	Students confirm that plants have a variety of cells and tissues with specific functions and systems to illustrate the relationship between certain specific chemicals in their processes.
5074.D3.2	Apply the knowledge of cell differentiation and the functions of the major types of cells to plant systems
5074.D3.3	Define primary and secondary growth and the role of the apical meristem on regulating growth.
5074.D3.4	Relate the active and passive transport of minerals into and through the root system to plant nutrition
5074.D3.5	Devise plans for plant management that applies knowledge of transpiration, translocation, and assimilation on plant growth.
5074.D3.6	Explain how leaves capture light energy and allow for the exchange of gases
5074.D3.7	Identify the different types of flowers, the components of a flower, the functions of a flower and the functions of lower components
5074.D3.8	Identify the macro and micronutrients essential for plant growth and describe some of their functions in plants

5074.D3.9	Select and defend the use of specific plant growth regulators to produce desired responses from plants
Domain	***Plant Genetics – Chemistry, Expression, and Modification***
5074.D4.1	Students apply concepts of the roles of t-RNA, m-RNA, DNA, other chemistry of genes and genomes, and a plant's environment in reproduction and expression to understand how plants reproduce and can be modified genetically.
5074.D4.2	Explain the structures of DNA and RNA
5074.D4.3	Explain the molecular basis for heredity and the tools and techniques used in DNA and RNA manipulations
5074.D4.4	Analyze factors that influence gene expression
5074.D4.5	Validate how genotype influences phenotype
5074.D4.6	Research the term genome
5074.D4.7	Compare and contrast DNA replication in mitosis and meiosis
5074.D4.8	Compare the different methods of genetic modification of crops throughout the history of domestication.
5074.D4.9	Evaluate the impact of plant breeding and other forms of genetic modification of crops on production practices, both locally and globally.
5074.D4.10	Evaluate and explain how scientists use the scientific method to develop new plant crop varieties
5074.D4.11	Evaluate methods of genetic modification for their short- and long-term benefits and risks
5074.D4.12	Devise and support an argument in favor of or against an ethical issue associated with biotechnology in agriculture
Domain	***Evolutionary Trends and Ecology***
5074.D5.1	Students evaluate a variety of environmental factors to understand how they contribute to the development and survival of plant species.
5074.D5.2	Explain the significance of genetic diversity to evolution.
5074.D5.3	Compare and contrast natural selection with artificial selection
5074.D5.4	Compare and contrast adaptations of plants for survival and seed dispersal in different environmental conditions
5074.D5.5	Explain how climate is a factor in the selection of both crop and ornamental plants
5074.D5.6	Define hybridization, and describe how it can lead to the development of unique species and varieties
5074.D5.7	Describe methods of producing transgenic plants and ways in which they are used
5074.D5.8	Explain the roles of plants in the global carbon cycle
5074.D5.9	Describe the nitrogen and phosphorus cycles
5074.D5.10	Describe various approaches to control plant and animal pests
5074.D5.11	Explain how plants sense changes in their environment and respond
5074.D5.12	Develop a familiarity with plants and sharpen observational skills and appreciate their role in human affairs.
Domain	***Physical Environment: Soils – Formation, Nutrients, and Chemistry***
5074.D6.1	Students evaluate different soil types to understand how they are formed, determined and how they compare to each other.
5074.D6.2	Define and describe the role of water holding capacity and hydraulic conductivity for and how that influences irrigation and drainage practices.
5074.D6.3	Describe how decomposers affect organic material formation

5074.D6.4	Describe the inverse relationship between drainage and oxygen availability
5074.D6.5	Compare and contrast ion exchange capacity in natural soils and artificial media
5074.D6.6	Define anion and cation, and describe their roles in soil science
5074.D6.7	Describe the physical and chemical structures and functions of soil components including sand, silt, clay, and organic matter
5074.D6.8	Identify and describe the various soil horizons and their roles
5074.D6.9	Explain the physical, chemical, geological, and biological processes of soil formation
5074.D6.10	Discuss the effects of soil pH on mineral availability and toxicity and apply necessary changes for maximum fertility.
5074.D6.11	Interpret laboratory analyses of soil and tissue samples and prescribe applications based on the results.
5074.D6.12	Identify, calculate, and calibrate appropriate fertilizer applications to meet plant nutrient needs.
Domain	***Careers***
5074.D7.1	Students examine the scope of career opportunities in, and the importance of agriculture to the economy.
5074.D7.2	Evaluate the nature and scope of animal sciences in agriculture, society, and the economy
5074.D7.3	Describe career opportunities and means to achieve those opportunities in plant and soil sciences
5074.D7.4	Identify how key organizational structures and processes affect organizational performance and the quality of products and services
5074.D7.5	Demonstrate those qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society
Domain	***Leadership***
5074.D8.1	Students validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education.
5074.D8.2	Communicate clearly, effectively, and with reason through speaking, writing, visuals, and active listening in formal and informal settings
5074.D8.3	Recognize and explain the role of the FFA in the development of leadership, education, employability, communications, and human relations skills
5074.D8.4	Examine roles within teams, work units, departments, organizations, inter- organizational systems, and the larger environment
5074.D8.5	Acquire the skills necessary to positively influence others
5074.D8.6	Develop a skill set to enhance the positive evolution of the whole person
Domain	***Supervised Agriculture Experience***
5074.D9.1	Students validate the necessity of a Supervised Agricultural Experience (SAE) program as a critical component to a well-rounded agricultural education.
5074.D9.2	Explain the nature of and become familiar with those terms related to an SAE program
5074.D9.3	Explore the numerous possibilities for an SAE program which a student might develop
5074.D9.4	Develop an individual SAE program and implementation plan for record keeping skills

Advanced Life Science: Foods		
Career Cluster	Agriculture	
Program of Study	Agri-Science – Plants or Animals	
NLPS Sequence	C	
Course Code	5072	
Course Description	*Advanced Life Science: Foods is a course that provides students with opportunities to participate in a variety of activities including laboratory work. This is a standards-based, interdisciplinary science course that integrates biology, chemistry, and microbiology in the context of foods and the global food industry. Students enrolled in this course formulate, design, and carry out food-base laboratory and field investigations as an essential course component. Students understand how biology, chemistry, and physics principles apply to the composition of foods, the nutrition of foods, food and food product development, food processing, food safety and sanitation, food packaging, and food storage. Students completing this course will be able to apply the principles of scientific inquiry to solve problems related to biology, physics, and chemistry in the context of highly advanced industry applications of foods.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a science requirement for CORE 40 diplomas Counts as a quantitative reasoning course for CORE 40 diplomas Counts as Science Credit for new diploma Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12 ● Any Home Economics K-12 ● Workplace Specialist: Agriculture Education in Food Science	
Rules 46-47	● Vocational Agriculture K-12 ● Any Standard Agriculture license ● Consumer Homemaking Education K-12 ● Occupational Education (FACS) K-12 ● Workplace Specialist: Agriculture Education in Food Science	
Rules 2002	● CTE: Agriculture with high school setting ● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Agriculture Education in Food Science	
REPA/REPA 3	● CTE: Agriculture 5-12	

	● CTE: Family and Consumer Sciences 5-12 ● Workplace Specialist: Agriculture Education in Food Science
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 108: Advanced Food Science
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Safety, Sanitation, and Quality of Food***
5072.D1.1	Students analyze and manage operational and safety procedures in food products and processing facilities.
5072.D1.2	Construct plans to ensure implementation of safety programs for food products, processing facilities, and the environment.
5072.D1.3	Devise and implement strategies to maintain equipment and facilities for food products and processing systems.
5072.D1.4	Describe the importance of performing quality-assurance tests on food products and applying corrective procedures as needed.
5072.D1.5	Demonstrate procedures for safe handling of food products.
5072.D1.6	Develop and implement operating procedures aligned with current industry regulations.
5072.D1.7	Students apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.
5072.D1.8	Identify sources of contamination in food products and/or processing facilities and develop ways to eliminate contamination
5072.D1.9	Examine, interpret, and report outcomes from safe handling procedures and results from quality assurance tests.
5072.D1.10	Interpret and evaluate results of quality assurance tests on food products and examine steps to implement corrective procedures.
5072.D1.11	Conduct and interpret microbiological tests for food-borne pathogens.
5072.D1.12	Characterize, identify, and research the physical, chemical, and biological properties of microbes as they pertain to food spoilage and foodborne illness.
5072.D1.13	Students apply food safety procedures when storing food products to ensure food quality.
5072.D1.14	Prepare plans that ensure implementation of proper food storage procedures.
5072.D1.15	Implement and evaluate the effectiveness of a documented procedure used within a food product and processing facility and recommend improvements.

Domain	***Nutrition, Biology, Microbiology, and Chemistry of Food Products***
5072.D2.1	Students apply principles of nutrition, biology, microbiology, and chemistry to develop food products that provide a safe, wholesome, and nutritious food supply for local and global food systems.
5072.D2.2	Analyze the physical, chemical, and biological properties of food products (e.g. oxidation, rancidity, hydrogenation, enzymatic browning, structures of essential nutrients, etc.) to evaluate nutritional value.
5072.D2.3	Construct methods to design a healthy daily food guide for a variety of nutritional value.
5072.D2.4	Design and conduct experiments to determine the chemical and physical properties of food products.
5072.D2.5	Devise and apply strategies to determine what additives are utilized and why they are included in a variety of food products (artificial sweeteners, preservatives, color, etc.).
5072.D2.6	Develop and implement plans to engineer new food items using biochemistry concepts.
5072.D2.7	Describe enzymes, the changes they cause in foods, and the physical and chemical parameters that affect enzymatic reactions.
5072.D2.8	Analyze digestion and absorption of essential nutrients.
5072.D2.9	Describe enzymes, the changes they cause in foods, and the physical and chemical parameters that affect enzymatic reactions.
5072.D2.10	Students apply principles of human behavior to develop food products to provide a safe, wholesome and nutritious food supply for local and global food systems.
5072.D2.11	Determine a strategy to prepare and label foods according to the established standards of regulatory agencies.
5072.D2.12	Design new food products that meet a variety of goals (e.g., consumer preferences, market, nutritional needs, regulatory requirements, etc.).
5072.D2.13	Perform sensory testing and marketing functions to characterize and determine consumer preference and marketing potential.
Domain	***Storage, Distribution, and Consumption of Food***
5072.D3.1	Implement selection, evaluation, and inspection techniques to ensure safe and quality food products.
5072.D3.2	Outline procedures to assign quality and yield grades to food products according to industry standards.
5072.D3.3	Develop, apply, and evaluate care and handling procedures to maintain original food quality and yield.
5072.D3.4	Examine and respond to consumer concerns about the inspection and harvesting techniques of animals using accurate information based on regulatory, agency approved or industry-approved techniques.
5072.D3.5	Evaluate and grade food products from different classifications of food products.
5072.D3.6	Students design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.
5072.D3.7	Design plans to formulate and package food products using a variety of weights and measures.
5072.D3.8	Evaluate food quality factors on foods prepared for different markets (e.g., shelf life, shrinkage, appearance, weight, etc.).
5072.D3.9	Devise and apply strategies to preserve different foods using various methods and techniques.

5072.D3.10	Construct and implement methods of selecting packaging materials to store a variety of food products.
5072.D3.11	Students create food distribution plans and procedures to ensure safe delivery of food products.
5072.D3.12	Devise and defend a strategy to determine ways for food distribution to reduce environmental impacts.
5072.D3.13	Make recommendations to improve safety procedures used in food distribution scenarios to ensure a safe product is being delivered to consumers.
5072.D3.14	Propose distribution plans for food products that meet specific market demands.
Domain	***History and Current Development of the Food Industry***
5072.D4.1	Students examine the scope of the food industry by evaluating local and global policies, trends, and customs for food production.
5072.D4.2	Articulate and defend a personal point of view on policies and legislation that affect the food products and processing system in the US or around the world.
5072.D4.3	Devise and implement a strategy to create food products that meet a specific consumer trend in a specific market.
5072.D4.4	Propose and implement culturally sensitive food processing and distribution practices.
5072.D4.5	Predict and defend upcoming changes and trends in the food products and processing industry.
5072.D4.6	Examine and respond to consumer concerns about the environment and safety of the food supply using accurate information regarding food products and processing systems and practices.
5072.D4.7	Research and evaluate the feasibility of implementing current or emerging technology to improve a current food product or process used in a facility.
5072.D4.8	Demonstrate an ability to critically evaluate the validity of information that commonly appears in newspapers, magazines, radio, and television (e.g., food recalls)
5072.D4.9	Students identify and explain the purpose of industry organizations, groups, and regulatory agencies that influence the local and global food systems.
5072.D4.10	Construct and implement methods to obtain data about organizations, groups, and regulatory agencies that affect the food products and processing industry.
5072.D4.11	Construct and implement plans that ensure adherence to industry standards for food products and processing facilities.
5072.D4.12	Analyze current government regulations.
5072.D4.13	Research and evaluate the impact of supplemental government programs (e.g., SNAP, Free & Reduced meals, WIC, etc.).
Domain	***Careers***
5072.D5.1	Students examine the scope of career opportunities in, and the importance of food science to the economy.
5072.D5.2	Evaluate the nature and scope of animal sciences in agriculture, society, and the economy
5072.D5.3	Describe career opportunities and means to achieve those opportunities in plant and soil sciences
5072.D5.4	Identify how key organizational structures and processes affect organizational performance and the quality of products and services
5072.D5.5	Demonstrate those qualities, attributes, and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society

Domain	Leadership
5072.D6.1	Students validate the necessity of leadership skills development in conjunction with participation in the national FFA Organization (FFA) and/or Family, Career and Community Leaders of America (FCCLA) as a critical component of the course.
5072.D6.2	Communicate clearly, effectively, and with reason through speaking, writing, visuals, and active listening in formal and informal settings
5072.D6.3	Recognize and explain the role of the CTSO in the development of leadership, education, employability, communications, and human relations skills
5072.D6.4	Examine roles within teams, work units, departments, organizations, inter- organizational systems, and the larger environment
5072.D6.5	Acquire the skills necessary to positively influence others
5072.D6.6	Develop a skill set to enhance the positive evolution of the whole person

Advanced Life Science, Animals (L)		
Career Cluster	Agriculture	
Program of Study	Agri-Science – Plants or Animals; Veterinary Science	
NLPS Sequence	C; B	
Course Code	5070	
Course Description	*Advanced Life Science: Animals is a two-semester course that provides students with opportunities to participate in a variety of activities including laboratory work. Students will explore concepts related to history and trends in animal agriculture as related to animal welfare, husbandry, diseases and parasites, laws and practices relating to handling, housing, environmental impact, global sustainable practices of animal agriculture, genetics, breeding practices, biotechnology uses, and comparative knowledge of anatomy and physiology of animals used in animal agriculture.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture; or Principles of Veterinary Science	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a science requirement for CORE 40 diplomas Counts as a quantitative reasoning course for CORE 40 diplomas Counts as Science Credit for new diploma Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12 ● Science/Biology 9-12 ● Workplace Specialist: Agriculture Education in Animal Science	

Rules 46-47	● Vocational Agriculture K-12 ● Any Standard Agriculture license ● Biology 9-12 ● Any Occupational Specialist I, II, or III: Agriculture 9-12 ● Workplace Specialist: Agriculture Education in Animal Science
Rules 2002	● CTE: Agriculture with high school setting ● Life Science with high school setting ● Workplace Specialist: Veterinary ● Workplace Specialist: Agriculture Education in Animal Science
REPA/REPA 3	● CTE: Agriculture 5-12 ● Life Science 5-12 ● Workplace Specialist: Veterinary ● Workplace Specialist: Agriculture Education in Animal Science
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 107: Advanced Animal Science
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Historic and Current Trends Impacting the Animal Systems Industry***
5070.D1.1	Evaluate the development and implications of animal origin, domestication and distribution and assess animal production methods for use in animal systems based on effectiveness.
5070.D1.2	Evaluate the implications of animal adaptations on production practices and the environment.
5070.D1.3	Predict trends and implications of future developments within different animal industries on production practices and the environment.
5070.D1.4	Evaluate the effectiveness of different production methods and defend the use of selected methods using data and evidence.
5070.D1.5	Devise and evaluate marketing plans for an animal agriculture product or service.
5070.D1.6	Select and defend the use of a specific record management system based upon its effectiveness for a business related to animal systems.
5070.D1.7	Devise and evaluate plans to manage wildlife populations to achieve optimal ecological

	health.
Domain	***Global Perspective of Laws and Sustainability***
5070.D2.1	Analyze and apply laws and sustainable practices to animal agriculture from a global perspective.
5070.D2.2	Evaluate the impact of laws pertaining to animal agriculture (e.g., pros, cons, effect on individuals, effect on businesses, etc.) and assess the compliance of production practices with established regulations.
5070.D2.3	Select, evaluate, and defend the use of sustainable practices in animal agriculture.
Domain	***Animal Husbandry and Welfare***
5070.D3.1	Demonstrate management techniques that ensure animal welfare and analyze procedures to ensure safety of animal products.
5070.D3.2	Implement and evaluate quality-assurance programs and procedures for animal production.
5070.D3.3	Devise, implement and evaluate safety procedures and plans for working with animals by species using information based on animal behavior and responses.
5070.D3.4	Devise economical recommendations to increase the welfare of animals in animal systems.
5070.D3.5	Select, evaluate, and defend the use of specific tools, technology or equipment used to perform animal husbandry and welfare tasks.
5070.D3.6	Research and evaluate programs to assure the safety of animal products for consumption.
5070.D3.7	Evaluate the effectiveness of animal and/or premise identification programs for a given species.
Domain	***Animal Nutrition***
5070.D4.1	Analyze the nutritional requirements of animals and analyze feed rations to assess their effectiveness
5070.D4.2	Assess nutritional needs for an individual animal based on its growth stage and production system.
5070.D4.3	Design and defend the use of a nutritional program by demonstrating the relationship between the nutrient requirements and the feedstuffs provided.
5070.D4.4	Identify essential and non-essential nutrients. In addition, describe the relationship between amino acids, vitamins, and minerals in the health of cells and organs.
5070.D4.5	Select appropriate feed stuffs for animals based on a variety of factors (e.g., economics, digestive system and nutritional needs, etc.).
5070.D4.6	Select and utilize animal feeds based on nutritional requirements, using rations for maximum nutrition and optimal economic production.
5070.D4.7	Make and defend decisions regarding whether to use feed additives and growth promotants after researching and considering scientific evidence, production system needs and goals, and input from industry professionals.
5070.D4.8	Select, evaluate, and defend the use of specific tools or equipment used to perform animal nutrition tasks.
5070.D4.9	Evaluate and summarize the potential impacts, positive and negative, of compliance and/or noncompliance with a feed label and feeding directions.
5070.D4.10	Research and recommend technological improvements to provide proper nutrition to

	animals.
Domain	***Animal Reproduction***
5070.D5.1	Students evaluate animals for breeding readiness and soundness and apply scientific principles to select and care for breeding animals.
5070.D5.2	Select breeding animals based on characteristics of the reproductive organs.
5070.D5.3	Evaluate and select animals for reproductive readiness.
5070.D5.4	Treat or cull animals with reproductive problems.
5070.D5.5	Summarize the process of sexual maturation
5070.D5.6	Identify and discuss various breeding systems in domesticated animals
5070.D5.7	Describe the function of the animal/host defense mechanism
5070.D5.8	Discuss the direct and indirect impact of disease on animal health
5070.D5.9	Compare and contrast the reproductive organs for male and female domesticated animal species.
5070.D5.10	Describe ectoderm, endoderm, and mesoderm as three germ layers that give rise to tissues and organs. Describe blastula and gastrula formation, and the function of morphogens, and recognize their importance in the developmental processes of vertebrates.
5070.D5.11	Define and describe estrous cycle(s). Describe how hormones act during the estrous cycle and how they are used to suppress it.
5070.D5.12	Discuss the social implications of reproductive and genetic technologies used in animal husbandry (e.g., embryo transfer, artificial insemination, gene transfer, cloning).
5070.D5.13	Describe spermatogenesis and sperm motility. List and explain factors that affect both.
5070.D5.14	Describe the steps in lactation.
5070.D5.15	Describe parturition and the method(s) used to predict when it occurs.
5070.D5.16	Select and evaluate a breeding system based on the principles of genetics.
5070.D5.17	Select and evaluate breeding animals and determine the probability of a given trait in their offspring.
5070.D5.18	Perform a DNA analysis and use the data to make and defend breeding decisions.
5070.D5.19	Create a plan to differentiate care of a species of breeding animals throughout their growth stages.
5070.D5.20	Describe ways that animals prevent inbreeding and discuss genetic diversity.
5070.D5.21	Compare and contrast natural selection with artificial selection, as used by humans to domesticate animals and breed improved varieties.
5070.D5.22	Compare and contrast adaptations of animals for survival in different environmental conditions.
5070.D5.23	Describe the role of biotechnology in the process of selection.
5070.D5.24	Explain the science behind mammalian cloning. Compare and contrast cloning a gene and an animal.
5070.D5.25	Describe the relationship between genotype and phenotype.
5070.D5.26	Select animal breeding methods based on reproductive and economic efficiency.
5070.D5.27	Evaluate the implementation and effectiveness of artificial insemination techniques.

5070.D5.28	Create and evaluate plans and procedures for estrous synchronization, superovulation, flushing, embryo transfer and other reproductive management practices.
5070.D5.29	Select and assess animal performance based on quantitative breeding values for specific characteristics.
Domain	***Animal Environmental Considerations***
5070.D6.1	Students design animal housing, equipment, and handling facilities for the major systems of animal production that comply with government regulations and safety standards.
5070.D6.2	Design an animal facility focusing on animal requirements, economic efficiency, sustainability, safety, and ease of handling.
5070.D6.3	Select, use, and evaluate equipment, technology, and handling procedures to enhance sustainability and production efficiency.
5070.D6.4	Evaluate facility designs and make recommendations to ensure that it meets standards for the legal, safe, ethical, economical, and efficient production of animals.
5070.D6.5	Evaluate the impact of laws pertaining to animal systems.
Domain	***Animal Classification, Anatomy, & Physiology***
5070.D7.1	Students classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).
5070.D7.2	Assess taxonomic characteristics and classify animals according to the taxonomic classification system.
5070.D7.3	Recommend different uses for an animal species based upon an analysis of local market needs.
5070.D7.4	Apply knowledge of classification terms to communicate with others about animal systems in an effective and accurate manner.
5070.D7.5	Define the terms hypertonic, hypotonic, and isotonic. Describe the phenomena of osmosis, and predict the direction that water will move given the concentrations of solutes in adjacent cells.
5070.D7.6	Describe the biochemistry and functions of animal cell membranes. In doing so, describe the fluid mosaic model of the membrane and the role of the cell membrane proteins in transporting materials in and out of cells.
5070.D7.7	Describe cellular respiration. Recognize that animals perform only respiration, while plants perform both photosynthesis and respiration. Also, describe the transformation of energy during respiration, and the role of ATP produced in respiration for other metabolic processes.
5070.D7.8	Students apply principles of comparative anatomy and physiology to uses within various animal systems.
5070.D7.9	Correlate the functions of animal cell structures to animal growth, development, health, and reproduction.
5070.D7.10	Apply the processes of meiosis and mitosis to solve animal growth, development, health and reproductive problems.
5070.D7.11	Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions.
5070.D7.12	Compare and contrast muscle function under anaerobic and aerobic conditions
5070.D7.13	Identify and explain the major organ systems found in vertebrae systems (Muscular, Skeletal,

	Circulatory, Respiratory, Digestive, Nervous, Endocrine, Integumentary, Excretory, Urinary, Immune)
5070.D7.14	Describe the organization of the animal body, cells, tissues, organs, and organ systems
5070.D7.15	Discuss four basic tissue types: epithelial, connective, muscle, and nervous
5070.D7.16	Students select and train animals for specific purposes and maximum performance based on anatomy and physiology.
5070.D7.17	Evaluate and select animals to maximize performance based on anatomical and physiological characteristics that affect health, growth, and reproduction
5070.D7.18	Choose, implement, and evaluate sustainable and efficient procedures (e.g., selection, housing, nutrition, and management) to produce consistently high-quality animals that are well suited for their intended purposes.
5070.D7.19	Evaluate and select animals to produce superior animal products based on industry standards.
Domain	***Animal Health***
5070.D8.1	Students design programs to prevent animal diseases, parasites and other disorders and ensure animal welfare.
5070.D8.2	Select and use tools and technology to meet specific animal health management goals.
5070.D8.3	Determine when an animal health concern needs to be referred to an animal health professional.
5070.D8.4	Treat common diseases, parasites, and physiological disorders of animals according to directions prescribed by an animal health professional.
5070.D8.5	Design and implement health maintenance and a disease and disorder prevention plan for animals in their natural and/or confined environments.
5070.D8.6	Identify and describe surgical and nonsurgical veterinary treatments and procedures to meet specific animal health care objectives.
5070.D8.7	Describe the function of the animal/host defense mechanism
5070.D8.8	Describe the use of antibiotics in animal health and describe how antibiotics work. Discuss the impact improper use of antibiotics has on antibiotic resistance.
5070.D8.9	Discuss the role of blood in host defense
5070.D8.10	Discuss the impact of disease on animal health.
5070.D8.11	Describe the various parasites and their impact on organ systems. Discuss host specificity and the importance of it.
5070.D8.12	Students analyze biosecurity measures utilized to protect the welfare of animals on a local, state, national, and global level.
5070.D8.13	Design and evaluate a biosecurity plan for an animal production operation.
5070.D8.14	Research and evaluate the effectiveness of zoonotic disease prevention methods and procedures to identify those that are best suited to ensure public safety and animal welfare.
Domain	***Environmental Impacts of Animal Production***
5070.D9.1	Design and implement methods to reduce the effects of animal production on the environment.
5070.D9.2	Devise a plan that includes measures to reduce the impact of animal agriculture on the

	environment.
5070.D9.3	Apply valid and reliable research evidence to predict the potential effects of different environmental conditions for an animal population.
5070.D9.4	Devise and improve plans to establish favorable environmental conditions for animal growth and performance based on a variety of factors (e.g., economic feasibility, environmental sustainability, impact on animals, etc.).
Domain	***Leadership***
5070.D10.1	Students validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education.
5070.D10.2	Communicate clearly, effectively, and with reason through speaking, writing, visuals, and active listening in formal and informal settings
5070.D10.3	Recognize and explain the role of the FFA in the development of leadership, education, employability, communications, and human relations skills
5070.D10.4	Examine roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment
5070.D10.5	Acquire the skills necessary to positively influence others
5070.D10.6	Develop a skill set to enhance the positive evolution of the whole person
Domain	***Supervised Agriculture Experience***
5070.D11.1	Students validate the necessity of a Supervised Agricultural Experience (SAE) program as a critical component to a well-rounded agricultural education.
5070.D11.2	Explain the nature of and become familiar with those terms related to an SAE program
5070.D11.3	Explore the numerous possibilities for an SAE program which a student might develop
5070.D11.4	Develop an individual SAE program and implementation plan for record keeping skills
Domain	***Careers***
5070.D12.1	Students examine the scope of career opportunities in, and the importance of agriculture to the economy.
5070.D12.2	Evaluate the nature and scope of animal sciences in agriculture, society, and the economy
5070.D12.3	Describe career opportunities and means to achieve those opportunities in animal science
5070.D12.4	Explain the nature of and become familiar with those terms related to an SAE program
5070.D12.5	Explore the numerous possibilities for an SAE program which a student might develop

Food Science	
Career Cluster	Agriculture
Program of Study	Agri-Science – Plants or Animals
NLPS Sequence	C
Course Code	5102

Course Description	*Food Science is a two semester course that provides students with an overview of food science and the role it plays in the securing of a safe, nutritious, and adequate food supply. A project-based approach is utilized in this course, along with laboratory, team building, and problem solving activities to enhance student learning. Students are introduced to the following areas of food science: food processing, food chemistry and physics, nutrition, food microbiology, preservation, packaging and labeling, food commodities, food regulations, issues and careers in the food science industry.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12 ● Any Home Economics K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Agriculture 9-12 ● Consumer Homemaking Education K-12	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Food Science ● CTE: Family & Consumer Sciences with high school setting	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Food Science 9-12 ● CTE: Family & Consumer Sciences 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	AGRI 104: Food Science	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***History and Current Trends of the Food Industry***
5102.D1.1	Explain the scope of the food industry and the historical and current developments of food products and processing.
5102.D1.2	Discuss the history and current trends to describe and explain the components (e.g., processing, distribution, byproducts) of the food products and processing industry.
5102.D1.3	Analyze the similarities and differences amongst policies and legislation that affect the food products, processing systems, and supply in the U.S. or around the world.
5102.D1.4	Analyze food production and distribution outcomes based on cultural customs.
5102.D1.5	Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, organics, microorganisms, contamination, irradiation).
5102.D1.6	Identify and explain the purpose of industry organizations, groups, and regulatory agencies that influence the local and global food systems.
5102.D1.7	Evaluate the purposes and changes in the food products and processing industry brought about by industry organizations or regulatory agencies
5102.D1.8	Explain the importance, application, and usage of industry standards in food products and processing
5102.D1.9	Prepare an implementation plan for industry standards in food products and processing systems
Domain	***Food Safety Principles and Processing Systems***
5102.D2.1	Students develop and implement procedures to ensure safety, sanitation, and quality in food product and processing facilities.
5102.D2.2	Describe contamination hazards (physical, chemical, and biological) associated with food products and processing
5102.D2.3	Outline procedures to eliminate possible contamination hazards associated with food products and processing
5102.D2.4	Analyze the effectiveness of a food product and processing company's Critical Control Point (CCP) procedures
5102.D2.5	Analyze and document attributes and procedures of current safety programs in food products and processing facilities.
5102.D2.6	Assess specifications and maintenance needs for equipment and processing systems (e.g., specifications for machines, sanitation procedures, repair protocol, etc.)
5102.D2.7	Students apply safety and sanitation procedures to understand the handling, processing, and storing of food products.
5102.D2.8	Explain and demonstrate techniques and procedures for the safe handling of food products
5102.D2.9	Describe the importance of and perform quality-assurance tests on food products
5102.D2.10	Describe the effects food-borne pathogens have on food products and humans
5102.D2.11	Conduct and interpret microbiological tests for food-borne pathogens and implement corrective procedures
5102.D2.12	Discuss documentation procedures in a food products and processing system
5102.D2.13	Explain safety standards that must be observed in facility design and equipment use
5102.D2.14	Outline guidelines for personnel safety in the food products and processing industry
5102.D2.15	Evaluate a facility to determine the implementation of safety procedures

Domain	***The Science and Nutrition of Food Products and The Processing Industry***
5102.D3.1	Students apply principles of nutrition, biology, microbiology, chemistry, and human behavior to make healthy food selections.
5102.D3.2	Discuss essential nutrients (proteins, carbohydrates, fats, vitamins, minerals, and water).
5102.D3.3	Explain the application of chemistry and physics to food science.
5102.D3.4	Explain the MyPlate recommendations in relation to essential nutrients for the human diet.
5102.D3.5	Identify common food additives (e.g., preservatives, antioxidants, buffers, stabilizers, colors, flavors).
5102.D3.6	Identify the key components of a food label and their significance to create an informed consumer.
Domain	***Processing, Preservation, Quality Control, and Packaging of Food Products***
5102.D4.1	Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.
5102.D4.2	Identify and assign quality and yield grades to meat, poultry, fish, dairy, fruits, vegetables, grains, legumes, and oilseeds.
5102.D4.3	Select raw food products based on yield grades, quality grades and related selection criteria.
5102.D4.4	Perform quality-control inspections of raw food products for processing.
5102.D4.5	Identify and describe acceptable animal treatment and processing techniques.
5102.D4.6	Explain desirable and undesirable characteristics of both pre-mortem and post- mortem animals in relation to the inspection and production of food products.
5102.D4.7	Students will apply processes, preservation, packaging, and food presentation to food products for sale and distribution to understand product development.
5102.D4.8	Compare weights and measurements of products and perform conversions between units of measure.
5102.D4.9	Outline appropriate methods and prepare foods for sale and distribution for different markets.
5102.D4.10	Analyze and document food preservation processes and methods on a variety of food products.
5102.D4.11	Analyze the degree of desirable food quality of foods stored in various packaging.
5102.D4.12	Explain materials and methods of food packaging and presentation.
5102.D4.13	Describe factors in planning and developing a new food product.
Domain	***Careers***
5102.D5.1	Students examine the scope of career opportunities in, and the importance of agriculture to the economy.
5102.D5.2	Evaluate the nature and scope of natural resources in agriculture, society, and the economy
5102.D5.3	Describe career opportunities and means to achieve those opportunities in natural resources
5102.D5.4	Identify how key organizational structures and processes affect organizational performance and the quality of products and services.
5102.D5.5	Demonstrate those qualities, attributes, and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society.
Domain	***Leadership***
5102.D6.1	Students validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded

	agricultural education.
5102.D6.2	Communicate clearly, effectively, and with reason through speaking, writing, visuals, and active listening in formal and informal settings
5102.D6.3	Recognize and explain the role of the FFA in the development of leadership, education, employability, communications, and human relations skills.
5102.D6.4	Examine roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.
5102.D6.5	Acquire the skills necessary to positively influence others.
5102.D6.6	Develop a skill set to enhance the positive evolution of the whole person.
Domain	***Supervised Agriculture Experience***
5102.D7.1	Students validate the necessity of a Supervised Agricultural Experience (SAE) program as a critical component to a well-rounded agricultural education.
5102.D7.2	Explain the nature of and become familiar with those terms related to an SAE program.
5102.D7.3	Explore the numerous possibilities for an SAE program which a student might develop.
5102.D7.4	Develop an individual SAE program and implement record keeping skills.

Agriculture Biotechnology Capstone		
Career Cluster	Agriculture	
Program of Study	Agri-Science – Plants or Animals	
NLPS Sequence	D	
Course Code	7230	
Course Description	*Ag Biotechnology is a two-semester course that concentrates on the applications of biotechnology in the agricultural industry. Students enrolled in this course will apply the use of living organisms to solve problems or make useful products. Students will become familiar with laboratory procedures such as cell/tissue culture, micropropagation, electrophoresis, etc. Students enrolled in this course will be required to use data and scientific techniques to solve problems concerning living organisms and will demonstrate competence in the application of principles and techniques for the development, application and management of biotechnology within the agriculture industry. As a capstone course, students should have the opportunity to apply their knowledge and use skills through an intensive work-based learning experience.*	
Prerequisite(s)/ Corequisite(s)	Agriscience Concentrator Sequence	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits max	
Counts Toward	Fulfills a science requirement for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Vocational Agriculture K-12	

	● Science/Biology 9-12
Rules 46-47	● Vocational Agriculture K-12 ● Any Standard Agriculture license ● Biology 9-12
Rules 2002	● CTE: Agriculture with high school setting ● Life Science with high school setting
REPA/REPA 3	● CTE: Agriculture 5-12 ● Life Science 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Biotechnology History and Current Issues***
7230.D1.1	Investigate and explain the relationship between past, current and emerging applications of biotechnology in agriculture
7230.D1.2	Research and summarize the evolution of biotechnology in agriculture.
7230.D1.3	Examine and categorize current applications and gains achieved in applying biotechnology to agriculture.
7230.D1.4	Distinguish between current and emerging applications of biotechnology in agriculture.
7230.D1.5	Compare and contrast the benefits and risks of biotechnology compared with alternative approaches to improving agriculture.
7230.D1.6	Evaluate the scope and implications of regulatory agencies on applications of biotechnology in agriculture and protection of public interests
7230.D1.7	Compare and contrast differences between regulatory systems worldwide.
7230.D1.8	Research and document major regulatory issues related to biotechnology in agriculture.
7230.D1.9	Explain the relationship between regulatory agencies and the protection of public interests such as health, safety and the environment.
7230.D1.10	Analyze the relationship and implications of bioethics, laws, and public perceptions on applications of biotechnology in agriculture.

7230.D1.11	Research and summarize the emergence, evolution and implications of bioethics associated with biotechnology in agriculture.
7230.D1.12	Research and summarize legal issues related to biotechnology in agriculture (e.g., protection of intellectual property through patents, copyright, trademarks, etc.).
7230.D1.13	Research and summarize public perceptions of biotechnology in agriculture (e.g., social, and cultural issues).
Domain	***Biotechnology Laboratory Procedures***
7230.D2.1	Read, document, evaluate and secure accurate laboratory records of experimental protocols, observations, and results.
7230.D2.2	Maintain and interpret laboratory records documented in a laboratory to ensure data accuracy and integrity (e.g., avoid bias, record any conflicts of interest, avoid misinterpreted results, etc.).
7230.D2.3	Research and summarize the need for data and information security in a laboratory and demonstrate best practices.
7230.D2.4	Evaluate the role of bioinformatics in agriculture and summarize the types of databases that are available (e.g., genomic, transcriptomics, etc.).
7230.D2.5	Implement standard operating procedures for the proper maintenance, use and sterilization of equipment in a laboratory.
7230.D2.6	Identify, interpret, and implement standard operating procedures for laboratory equipment.
7230.D2.7	Manipulate basic laboratory equipment and measurement devices (e.g., water bath, electrophoresis equipment, micropipettes, laminar flow hood, etc.).
7230.D2.8	Perform sterilization techniques for equipment in a laboratory using standard operating procedures.
7230.D2.9	Apply standard operating procedures for the safe handling of biological and chemical materials in a laboratory.
7230.D2.10	Demonstrate advanced aseptic techniques in the laboratory (e.g., sterile work area, sterile handling, personal hygiene, etc.).
7230.D2.11	Examine and implement standard operating procedures for the use of biological materials according to directions and their classification (e.g., proper handling of bacteria or DNA before, during and after use).
7230.D2.12	Formulate and prepare solutions using standard operating procedures (e.g., proper labeling, storage, etc.).
7230.D2.13	Examine and perform scientific procedures using microbes, DNA, RNA, and proteins in a laboratory.
7230.D2.14	Characterize the physical and biological properties of organisms.
7230.D2.15	Compare and contrast the structures of DNA and RNA and investigate how genotype influences phenotype.
7230.D2.16	Perform electrophoretic techniques and interpret electrophoresis fragmentation patterns (e.g., gel electrophoresis, southern blotting, etc.).
7230.D2.17	Examine and document the role and applications of proteins in agricultural biotechnology.
7230.D2.18	Synthesize the relationship between proteins, enzymes, and antibodies.
Domain	***Biotechnology in Agriculture***
7230.D3.1	Apply biotechnology principles, techniques, and processes to create transgenic species through genetic engineering.

7230.D3.2	Summarize biological, social, agronomic, and economic reasons for genetic modification of eukaryotes.
7230.D3.3	Summarize the process of transformation of eukaryotic cells with transgenic DNA.
7230.D3.4	Analyze the benefits and risks associated with the use of biotechnology to increase productivity and improve quality of living species (e.g., plants, animals such as aquatic species, etc.).
7230.D3.5	Define and summarize epigenetics and synthesize the relationship between mutation, migration and evolution of transgenes in the environment.
7230.D3.6	Apply biotechnology principles, techniques, and processes to enhance the production of food using microorganisms and enzymes.
7230.D3.7	Summarize reasons for detecting microbes and identify sources of microbes.
7230.D3.8	Examine enzymes, the changes they cause and the physical and chemical parameters that affect enzymatic reactions (e.g., food, cellulosic bioenergy, etc.).
7230.D3.9	Identify and categorize foods produced using biotechnology (e.g., fermentation, etc.) to change the chemical properties of food for an intended purpose (e.g., create desirable nutritional profile, preservation, flavor, etc.)
7230.D3.10	Apply biotechnology principles, techniques, and processes to protect the environment and maximize use of natural resources (e.g., biomass, bioprospecting, industrial biotechnology, etc.).
7230.D3.11	Examine the consequences of agricultural practices on natural populations.
7230.D3.12	Define and summarize industrial biotechnology and categorize the benefits and risks associated with its use in manufacturing (e.g., fabrics, plastics, etc.).
7230.D3.13	Research and summarize the potential applications of bioprospecting in biotechnology and agriculture.
7230.D3.14	Apply biotechnology principles, techniques, and processes to enhance plant and animal care and production
7230.D3.15	Research and describe the aims and techniques involved in selective plant-breeding process.
7230.D3.16	Examine and classify biotechnology processes applicable to animal health (e.g., genetic testing, etc.).
7230.D3.17	Research and categorize the types of pharmaceuticals developed for animals and humans through biotechnology
7230.D3.18	Summarize the need for global biodiversity and applications of biotechnology to reduce threats to biodiversity.
7230.D3.19	Apply biotechnology principles, techniques, and processes to produce biofuels (e.g., fermentation, transesterification, methanogenesis, etc.).
7230.D3.20	Examine and synthesize the need for biofuels (e.g., cellulosic bioenergy, etc.).
7230.D3.21	Differentiate between biomass and sources of biomass.
7230.D3.22	Research and explain the process of fermentation and its potential applications.
7230.D3.23	Define and summarize the process of transesterification and its potential applications.
7230.D3.24	Examine the process of methanogenesis and its potential applications.
7230.D3.25	Apply biotechnology principles, techniques, and processes to improve waste management (e.g., genetically modified organisms, bioremediation, etc.).
7230.D3.26	Compare and contrast the use of natural organisms and genetically engineered organisms in the treatment of wastes.

7230.D3.27	Summarize the purpose of microorganisms in biological waste management.
7230.D3.28	Analyze the role of microorganisms in industrial chemical waste treatment.
7230.D3.29	Provide examples of instances in which bioremediation can be applied to clean up environmental contaminants.

Agricultural Research Capstone		
Career Cluster	Agriculture	
Program of Study	Agri-Science – Platns or Animals; Ag Mechanical and Engineering	
NLPS Sequence	D	
Course Code	7262	
Course Description	*Agricultural Research Capstone course includes extended laboratory, field, and literature investigations in one or more specialized agricultural science disciplines, such as animal, plant, food, natural resources, biotechnology, engineering, etc. Students enrolled in this course will apply scientific applications, concepts, principles, and design process to solve complex, real-world issues in agriculture. Students will become familiar with laboratory procedures used in an educational, research, or industrial setting. Students will complete an end-of-course project and presentation, such as a scientific research paper, agriscience fair project, or some other suitable presentation of their findings.*	
Prerequisite(s)/ Corequisite(s)	Any Agriculture Concentrator Sequence	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Vocational Agriculture K-12 ● Science/Biology 9-12	
Rules 46-47	● Vocational Agriculture K-12 ● Any Standard Agriculture license ● Biology 9-12	
Rules 2002	● CTE: Agriculture with high school setting ● Life Science with high school setting	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Life Science 5-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Identify a Problem***
7262.D1.1	Examine historical and current data to identify issues impacting AFNR systems.
7262.D1.2	Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems.
7262.D1.3	Evaluate and explain how scientists use the scientific method to build upon previous findings in current and emerging research.
7262.D1.4	Solve problems in AFNR workplaces or scenarios using technology.
7262.D1.5	Evaluate the importance of technology use and how it impacts AFNR systems.
7262.D1.6	Analyze and assess at least two public policies that impact each AFNR system.
7262.D1.7	Create and propose a hypothetical policy that will impact current AFNR systems.
7262.D1.8	Evaluate geographic data and select necessary data sets to solve problems within AFNR systems.
7262.D1.9	Devise a strategy to solve a problem in an AFNR system using a set of economic data.
Domain	***Design an Experiment or Research Parameters to Address Problem***
7262.D2.1	Execute health, safety, and environmental procedures to comply with regulatory and safety standards.
7262.D2.2	Construct and implement methods to evaluate compliance with required safety, health, and environmental management regulations.
7262.D2.3	Create and implement a health and safety policy plan for AFNR workplaces.
7262.D2.4	Assess various emergency response plan requirements for an AFNR workplaces and/or facility.
7262.D2.5	Examine and categorize examples of how to avoid health or safety risks in AFNR workplaces.
7262.D2.6	Create a plan to mitigate the level of contamination or injury identified as a risk in the workplace.
7262.D2.7	Design and implement plans to ensure the use of appropriate protective equipment when using various AFNR tools and equipment.
7262.D2.8	Evaluate and select appropriate tools and equipment to complete AFNR tasks.

7262.D2.9	Assess and demonstrate appropriate operation, storage, and maintenance techniques for AFNR tools and equipment.
Domain	***Conduct Research and/or Experiment***
7262.D3.1	Maintain and interpret laboratory records documented in a laboratory to ensure data accuracy and integrity (e.g., avoid bias, record any conflicts of interest, avoid misinterpreted results, etc.).
7262.D3.2	Devise a strategy for ensuring the security of data and information collected in a laboratory
7262.D3.3	Assess the need for personal protective equipment in a variety of situations and select the appropriate equipment to wear when working with biological and chemical materials.
7262.D3.4	Perform waste disposal according to the standard operating procedures.
7262.D3.5	Perform ongoing maintenance of laboratory equipment according to the standard operating procedures (e.g., calibration, testing, etc.).
7262.D3.6	Operate advanced laboratory equipment and measurement devices.
Domain	***Evaluate Findings***
7262.D4.1	Evaluate progress toward AFNR career goals and identify opportunities for improvement and necessary adjustments to one's plan of action
7262.D4.2	Implement one's personal plan of action for obtaining the required education, training and experiences and evaluate progress to identify opportunities for improvement and necessary adjustments.
7262.D4.3	Evaluate, update, and improve a set of personal tools to reflect current skills, experiences, education, goals, etc. and complete the processes needed to pursue and obtain a career in an AFNR pathway.
7262.D4.4	Assess personal skills and align them with potential career opportunities in AFNR pathways.

Agriculture Horticulture							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7117	Principles of Agriculture	5132	Horticultural Science - NLPS	7114	Greenhouse and Soilless Production	7232	Horticulture Capstone

Principles of Agriculture		
Career Cluster	Agriculture	
Program of Study	Ag Mechanical and Engineering, Agri-Science – Plants or Animals, Horticulture, Landscaping, Natural Resources, Precision Agriculture	
NLPS Sequence	A	
Course Code	7117	
Course Description	*Principles of Agriculture is a two-semester course that will cover the diversity of the agricultural industry and agribusiness concepts. Students will develop an understanding of the role of agriculture in the United States and globally. Students will explore Agriculture, Food, and Natural Resource (AFNR) systems related to the production of food, fiber and fuel and the associated health, safety and environmental management systems. Topics covered in the course range from animals, plants, food, natural resources, ag power, structures and technology, and agribusiness. Participation in FFA and Supervised Agricultural Experiences (SAE) will be an integral part of this course in order to develop leadership and career ready skills.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Occupational Specialist I, II, or III in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter	

Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Agribusiness Management ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
REPA/REPA 3	● CTE: Agriculture 9-12 ● Workplace Specialist: Agribusiness 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 100: Introduction to Agriculture; AGRI 102: Agricultural Business and Farm Management
VU Course Alignment	AGBS 101: Introduction to Agribusiness Management
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Urban Horticulture (1.0601), CT Landscaping Technician (1.0605), TC Precision Agriculture Specialist (1.0201) VU - CG Agribusiness (1.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***AFNR Systems***
7117.D1.1	Describe the role of agriculture in the US and global societies through the domestication and distribution of the world's important crop and livestock species.
7117.D1.2	Recognize the diversity of AFNR systems in the US and the world.
7117.D1.3	Understand the size and productivity of farms and ranches in the US and around the world.
7117.D1.4	Understand US production systems for major grain crops, including Crop Rotation Systems, Tillage Systems, Variety Selection, and Harvest and grain storage technology.
7117.D1.5	Understand US production systems for major livestock animals.
7117.D1.6	Research, examine, and discuss issues and trends that impact AFNR systems on local, state, national and global levels.
7117.D1.7	Examine technologies and analyze their impact on AFNR systems.
Domain	***Agribusiness***
7117.D2.1	To have students develop an understanding of how economics relates to agriculture, and how economic principles are used to analyze and solve problems in agriculture and agribusiness.
7117.D2.2	To have students understand the structure of the U.S. Agriculture and how agriculture interacts with the aggregate economic system.
7117.D2.3	To have students recognize the role of producers, input suppliers, food marketing organizations, and consumers in the U.S. Agricultural economy.

7117.D2.4	Help students understand the qualities and characteristics employers in agribusiness expect in prospective employees and how students can develop those qualities and characteristics.
7117.D2.5	Describe the diversity of jobs and careers in agricultural industries in Indiana and the US.
Domain	***Safety, Health, and Environment Management Systems***
7117.D3.1	Identify and explain the implications of required regulations to maintain and improve safety, health, and environmental management systems.
7117.D3.2	Summarize the importance of safety, health, and environmental management in the workplace.
7117.D3.3	Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.
Domain	***Supervised Agriculture Experience (SAE)***
7117.D4.1	Explain the nature of and become familiar with those terms related to an SAE program.
7117.D4.2	Explore the numerous possibilities for an SAE program which a student might develop.
7117.D4.3	Develop an individual SAE program and implementation plan for record keeping skills.
Domain	***Agricultural Business and Farm Management***
7117.D5.1	Discuss the basic principles of management and decision-making as related to both farm and non-farm agribusiness.
7117.D5.2	Apply economic principles to case studies in farm and agribusiness.
7117.D5.3	Understand the major financial statements: what they report, how to interpret and use the data and how they are connected
7117.D5.4	Know the alternatives to meeting needs when resource analysis indicates the labor input in a business needs altered. Includes review of resume, interviewing and other job application skills.
7117.D5.5	Identify the best combination of resources to use relative to the enterprises selected for the operation including crop inputs, livestock inputs, machinery and equipment, and farmstead and buildings.
7117.D5.6	Know the alternatives for farm recordkeeping and analysis
7117.D5.7	The student will learn to work with others in a management team to combine a limited number of inputs (price, credit policy, advertising dollars, and quantity ordered) within given parameters to experience the outcomes (profits). Emphasis is placed on the practical application of financial statements for analysis.
Domain	***Career Navigation***
7117.D6.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7117.D6.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7117.D6.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7117.D6.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7117.D7.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7117.D7.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and

	organizations.
7117.D7.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7117.D7.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7117.D8.1	Demonstrate computer literacy skills and basic computer functions.
7117.D8.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7117.D8.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7117.D8.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Horticultural Science		
Career Cluster	Agriculture	
Program of Study	Horticulture	
NLPS Sequence	B	
Course Code	5132	
Course Description	*Horticulture Science is a two semester course that provides students with a background in the field of horticulture. Coursework includes hands-on activities that encourage students to investigate areas of horticulture as it relates to the biology and technology involved in the production, processing, and marketing of horticultural plants and products. Students are introduced to the following areas of horticulture science: reproduction and propagation of plants, plant growth, growth-media, management practices for field and greenhouse production, marketing concepts, production of plants of local interest, greenhouse management, floral design, and pest management. Students participate in a variety of activities including extensive laboratory work usually in a school greenhouse.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Standard Ornamental Horticulture License 9-12 ● Any Standard Agriculture license	

	● Occupational Specialist I, II, or III: Ornamental Horticulture 9-12 ● Agribusiness Horticulture 9-12
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Horticultural Science
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Horticultural Science 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 116: Survey of Horticulture; AGRI 117: Soil Science
VU Course Alignment	HORT 105: Introduction to Landscape Horticulture
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Urban Horticulture (1.0601) VU - A.S. Horticulture Technology (01.0601)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Survey of Horticulture***
5132.D1.1	Differentiate between the major groups of horticultural plants: herbaceous and woody, annual and perennial, temperate, and tropical.
5132.D1.2	Identify the common plant species used in horticulture.
5132.D1.3	Describe the basic functions of plants parts and how plants adapt to the environment.
5132.D1.4	Explain modern plant propagation techniques and how they are applied to different plant groups.
5132.D1.5	Describe the fundamentals of plant breeding and how it applies to ornamental plants.
5132.D1.6	Characterize the types of environments involved in horticulture: landscape, greenhouse, and indoor environments.
5132.D1.7	Demonstrate knowledge of the environmental factors involved in ornamental plant production including soils, water and pests.
Domain	***Soil Science***
5132.D2.1	Understanding applied chemical, physical, and biological concepts related to soil.
5132.D2.2	Understanding of the origin, classification, and distribution of soils and their relationship to people and food production.
5132.D2.3	Understanding of the fertility management and conservation of soils.
5132.D2.4	Understand the environmental impact of soil use.
5132.D3.1	Establish production and maintenance practices for field and greenhouse production

Greenhouse and Soilless Production		
Career Cluster	Agriculture	
Program of Study	Horticulture	
NLPS Sequence	C	
Course Code	7114	
Course Description	*Greenhouse and Soilless Production is a two-semester course that provides an overview of structural designs and uses of enclosed structures (greenhouses) to grow various plants and food. The course will focus on discussing different types of enclosed structures, management systems, and growing systems used to produce plants and food. The course will also present an overview of soilless growing systems such as hydroponics, aquaponics, aeroponics and fogponics. Students will utilize the school greenhouse as part of this course.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Standard Ornamental Horticulture License 9-12 ● Any Standard Agriculture license ● Occupational Specialist I, II, or III: Ornamental Horticulture 9-12 ● Agribusiness Horticulture 9-12	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Horticultural Science	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Horticultural Science 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	AGRI 175: Introduction to Greenhouse Management; AGRI 129: Alternative Growing Methods	
VU Course Alignment	HORT 165: Greenhouse Management and Hydroponics	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Urban Horticulture (1.0601) VU - CPC Horticultural Science, A.S. Horticulture Technology (01.0601)	
Liberal		

Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Greenhouse Production***
7114.D1.1	Identify different types of greenhouse structures and relate why that system is utilized.
7114.D1.2	Demonstrate basic greenhouse operational/management procedures (day to day events)
7114.D1.3	Develop management strategies for different types of greenhouses
7114.D1.4	Perform identification, care, and maintenance for a specific set of plants/food grown in an enclosed structure
7114.D1.5	Classify different types of growing systems that can be used in greenhouses.
Domain	***Soilless Production***
7114.D2.1	Analyze the basic construction and use of various soilless growing systems.
7114.D2.2	Recognize terminology used in alternative growing methods systems.
7114.D2.3	Design and create soilless growing systems (to take home if desired).
7114.D2.4	Troubleshoot issues that arise in soilless growing systems.
7114.D2.5	Construct and operate various soilless growing systems.
7114.D2.6	Describe the types of plants and foods (and plant requirements) that can be grown in soilless systems.

Horticulture Capstone	
Career Cluster	Agriculture
Program of Study	Horticulture
NLPS Sequence	D
Course Code	7232
Course Description	*The Horticulture Capstone course builds upon the knowledge and skills developed in the Principles, Horticultural Science, and Greenhouse and Soilless Production courses by developing advanced skills that students can apply to the field. As a capstone course, students should have the opportunity to apply their knowledge and use skills through an intensive work-based learning experience.*
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture; Horticultural Science; Greenhouse and Soilless Production
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits max
Counts Toward	Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma
Dual Credit Status	X (PCL/CTE)

Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Standard Ornamental Horticulture License 9-12 ● Any Standard Agriculture license ● Occupational Specialist I, II, or III: Ornamental Horticulture 9-12 ● Agribusiness Horticulture 9-12	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Horticultural Science	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Horticultural Science 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	AGRI 130: Introduction to Vegetable Production; AGRI 176: Urban Food & Agriculture	
VU Course Alignment	HORT 215: Urban Food Production ▾	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Urban Horticulture (1.0601), TC Precision Agriculture Specialist (1.0201) VU - A.S. Horticulture Technology (01.0601)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Vegetable Production***	
7232.D1.1	Describe current vegetable production systems and where those systems are utilized.	
7232.D1.2	Analyze markets for vegetables with an emphasis on Indiana.	
7232.D1.3	Explain the principles of growing in soil versus water.	
7232.D1.4	Investigate how soil type affects vegetable plant production.	
7232.D1.5	Analyze the differences in management when growing in open fields and high tunnels.	
7232.D1.6	Analyze the differences in management when growing in aquaponic and hydroponic systems	
7232.D1.7	Investigate which species and cultivars are best adapted to different growing systems.	
7232.D1.8	Describe harvest methods for vegetables in different growing systems.	
7232.D1.9	Explain best practices in handling produce to minimize spoilage and the spread of foodborne pathogens.	
7232.D1.10	Examine and prepare students for GAPS and Serve Safe certification.	

7232.D1.11	Explain the pros and cons of large- and small-scale vegetable production.
Domain	***Urban Food Production***
7232.D2.1	Describe the types of urban food and agriculture production utilized in society.
7232.D2.2	Research the history and need for urban food production in the United States.
7232.D2.3	Analyze the importance of space conservation in urban environments.
7232.D2.4	Recognize key terminology, methods, regulations, and marketing strategies utilized in urban farming.
7232.D2.5	Create an urban farm business plan.

Agriculture Landscaping							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7117	Principles of Agriculture	5132	Horticultural Science - NLPS	7115	Landscape and Turf Management	7234	Landscape Management Capstone

Principles of Agriculture		
Career Cluster	Agriculture	
Program of Study	Ag Mechanical and Engineering, Agri-Science – Plants or Animals, Horticulture, Landscaping, Natural Resources, Precision Agriculture	
NLPS Sequence	A	
Course Code	7117	
Course Description	*Principles of Agriculture is a two-semester course that will cover the diversity of the agricultural industry and agribusiness concepts. Students will develop an understanding of the role of agriculture in the United States and globally. Students will explore Agriculture, Food, and Natural Resource (AFNR) systems related to the production of food, fiber and fuel and the associated health, safety and environmental management systems. Topics covered in the course range from animals, plants, food, natural resources, ag power, structures and technology, and agribusiness. Participation in FFA and Supervised Agricultural Experiences (SAE) will be an integral part of this course in order to develop leadership and career ready skills.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Occupational Specialist I, II, or III in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter	

Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Agribusiness Management ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
REPA/REPA 3	● CTE: Agriculture 9-12 ● Workplace Specialist: Agribusiness 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 100: Introduction to Agriculture; AGRI 102: Agricultural Business and Farm Management
VU Course Alignment	AGBS 101: Introduction to Agribusiness Management
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Urban Horticulture (1.0601), CT Landscaping Technician (1.0605), TC Precision Agriculture Specialist (1.0201) VU - CG Agribusiness (1.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***AFNR Systems***
7117.D1.1	Describe the role of agriculture in US and global societies through the domestication and distribution of the world's important crop and livestock species.
7117.D1.2	Recognize the diversity of AFNR systems in the US and the world.
7117.D1.3	Understand the size and productivity of farms and ranches in the US and around the world.
7117.D1.4	Understand US production systems for major grain crops, including Crop Rotation Systems, Tillage Systems, Variety Selection, and Harvest and grain storage technology.
7117.D1.5	Understand US production systems for major livestock animals.
7117.D1.6	Research, examine, and discuss issues and trends that impact AFNR systems on local, state, national and global levels.
7117.D1.7	Examine technologies and analyze their impact on AFNR systems.
Domain	***Agribusiness***
7117.D2.1	To have students develop an understanding of how economics relates to agriculture, and how economic principles are used to analyze and solve problems in agriculture and agribusiness.
7117.D2.2	To have students understand the structure of the U.S. Agriculture and how agriculture interacts with the aggregate economic system.
7117.D2.3	To have students recognize the role of producers, input suppliers, food marketing organizations, and consumers in the U.S. Agricultural economy.

7117.D2.4	Help students understand the qualities and characteristics employers in agribusiness expect in prospective employees and how students can develop those qualities and characteristics.
7117.D2.5	Describe the diversity of jobs and careers in agricultural industries in Indiana and the US.
Domain	***Safety, Health, and Environment Management Systems***
7117.D3.1	Identify and explain the implications of required regulations to maintain and improve safety, health, and environmental management systems.
7117.D3.2	Summarize the importance of safety, health, and environmental management in the workplace.
7117.D3.3	Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.
Domain	***Supervised Agriculture Experience (SAE)***
7117.D4.1	Explain the nature of and become familiar with those terms related to an SAE program.
7117.D4.2	Explore the numerous possibilities for an SAE program which a student might develop.
7117.D4.3	Develop an individual SAE program and implementation plan for record keeping skills.
Domain	***Agricultural Business and Farm Management***
7117.D5.1	Discuss the basic principles of management and decision-making as related to both farm and non-farm agribusiness.
7117.D5.2	Apply economic principles to case studies in farm and agribusiness.
7117.D5.3	Understand the major financial statements: what they report, how to interpret and use the data and how they are connected
7117.D5.4	Know the alternatives to meeting needs when resource analysis indicates the labor input in a business needs altered. Includes review of resume, interviewing and other job application skills.
7117.D5.5	Identify the best combination of resources to use relative to the enterprises selected for the operation including crop inputs, livestock inputs, machinery and equipment, and farmstead and buildings.
7117.D5.6	Know the alternatives for farm recordkeeping and analysis
7117.D5.7	The student will learn to work with others in a management team to combine a limited number of inputs (price, credit policy, advertising dollars, and quantity ordered) within given parameters to experience the outcomes (profits). Emphasis is placed on the practical application of financial statements for analysis.
Domain	***Career Navigation***
7117.D6.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7117.D6.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7117.D6.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7117.D6.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7117.D7.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7117.D7.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and

	organizations.
7117.D7.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7117.D7.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7117.D8.1	Demonstrate computer literacy skills and basic computer functions.
7117.D8.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7117.D8.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7117.D8.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Horticultural Science		
Career Cluster	Agriculture	
Program of Study	Landscaping	
NLPS Sequence	B	
Course Code	5132	
Course Description	*Horticulture Science is a two semester course that provides students with a background in the field of horticulture. Coursework includes hands-on activities that encourage students to investigate areas of horticulture as it relates to the biology and technology involved in the production, processing, and marketing of horticultural plants and products. Students are introduced to the following areas of horticulture science: reproduction and propagation of plants, plant growth, growth-media, management practices for field and greenhouse production, marketing concepts, production of plants of local interest, greenhouse management, floral design, and pest management. Students participate in a variety of activities including extensive laboratory work usually in a school greenhouse.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Standard Ornamental Horticulture License 9-12 ● Any Standard Agriculture license	

	● Occupational Specialist I, II, or III: Ornamental Horticulture 9-12 ● Agribusiness Horticulture 9-12
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Horticultural Science
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Horticultural Science 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 116: Survey of Horticulture; AGRI 117: Soil Science
VU Course Alignment	HORT 105: Introduction to Landscape Horticulture
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Urban Horticulture (1.0601) VU - A.S. Horticulture Technology (01.0601)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Survey of Horticulture***
5132.D1.1	Differentiate between the major groups of horticultural plants: herbaceous and woody, annual and perennial, temperate, and tropical.
5132.D1.2	Identify the common plant species used in horticulture.
5132.D1.3	Describe the basic functions of plants parts and how plants adapt to the environment.
5132.D1.4	Explain modern plant propagation techniques and how they are applied to different plant groups.
5132.D1.5	Describe the fundamentals of plant breeding and how it applies to ornamental plants.
5132.D1.6	Characterize the types of environments involved in horticulture: landscape, greenhouse, and indoor environments.
5132.D1.7	Demonstrate knowledge of the environmental factors involved in ornamental plant production including soils, water, and pests.
Domain	***Soil Science***
5132.D2.1	Understanding applied chemical, physical, and biological concepts related to soil.
5132.D2.2	Understanding of the origin, classification, and distribution of soils and their relationship to people and food production.
5132.D2.3	Understanding of the fertility management and conservation of soils.
5132.D2.4	Understand the environmental impact of soil use.
5132.D3.1	Establish production and maintenance practices for field and greenhouse production

Landscape and Turf Management		
Career Cluster	Agriculture	
Program of Study	Landscaping	
NLPS Sequence	C	
Course Code	7115	
Course Description	*Landscape and Turf Management is a two-semester course that provides the student with an overview of the many career opportunities in the diverse field of landscape and turf management. Students are introduced to the procedures used in the planning and design of a landscape using current technology practices, the principles and procedures involved with landscape construction, the determination of maintenance schedules, communications, and management skills necessary in landscaping operations, and the care and use of equipment utilized by landscapers. Upon completion of the program, students have the opportunity to become Indiana Landscape Industry Certified through a state approved program.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Agriculture 9-12	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Landscape Management ● Workplace Specialist: Ornamental Horticulture	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Landscape Management 9-12 ● Workplace Specialist: Ornamental Horticulture 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	AGRI 164: Landscape Design I; AGRI 165: Turf Science	
VU Course Alignment	HORT 205: Landscaping I - Landscape Design ▾	
Four Yr. Course		

Alignment	
Postsecondary Credential	ITCC - CT Landscape Technician (1.0605) VU - A.S. Horticulture Technology (01.0601)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Landscape Management***
7115.D1.1	Describe the elements of a practical landscape design given the function and location of the site.
7115.D1.2	Identify the trees, shrubs, perennials, annuals, groundcovers, and turf that best meet the needs of the landscape design.
7115.D1.3	Identify the hard-scape elements that are required for a landscape design.
7115.D1.4	Identify the site requirements such as grading, mounding and irrigation that are required for a landscape design.
7115.D1.5	Demonstrate the skills necessary to draw manually and electronically a comprehensive landscape design based on site and utilization criteria.
7115.D1.6	Identify pests commonly found in landscaped areas and explain their control.
Domain	***Turf Management***
7115.D2.1	Identify major turf grass species and describe their advantages in turf applications.
7115.D2.2	Identify the pests of lawns, athletic fields and golf courses and explain their control.
7115.D2.3	Describe the soil and site conditions that promote healthy turf.
7115.D2.4	Explain the major techniques involved in establishing turf.
7115.D2.5	Explain the basic characteristics of irrigation systems and their use in turf maintenance.
7115.D2.6	Demonstrate skills necessary to install and maintain turf in the landscape.
Domain	***Safety, Health, and Environment Management Systems***
7115.D3.1	Identify and explain the implications of required regulations to maintain and improve safety, health and environmental management systems.
7115.D3.2	Summarize the importance of safety, health, and environmental management in the workplace.
7115.D3.3	Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.

Landscape Management Capstone	
Career Cluster	Agriculture
Program of Study	Landscaping
NLPS Sequence	D

Course Code	7234	
Course Description	*The Landscape Capstone course builds upon the knowledge and skills developed in the Principles, Horticultural Science and Landscape and Turf Management courses by developing advanced skills that students can apply to the field. As a capstone course, students should have the opportunity to apply their knowledge and use skills through an intensive work-based learning experience.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture; Horticultural Science; Landscape and Turf Management	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Agriculture 9-12	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Landscape Management ● Workplace Specialist: Ornamental Horticulture	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Landscape Management 9-12 ● Workplace Specialist: Ornamental Horticulture 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	AGRI 261: Herbaceous Landscape Plants*; AGRI 262: Woody Landscape Plants*	
VU Course Alignment	HORT 255: Landscaping II - Landscape Management and Construction ▾	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Landscape Technician (1.0605) VU - A.S. Horticulture Technology (01.0601)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		

Competency #	Competency
Domain	***Herbaceous Landscape Plants***
7234.D1.1	Identify, maintain, and properly select the major groups of annual bedding plants.
7234.D1.2	Identify, maintain, and properly select the major groups of perennial flowering plants.
7234.D1.3	Identify, maintain, and properly select the major groups of hardy ornamental grasses.
7234.D1.4	Explain the cultural requirements of annuals, perennials, and grasses in Midwestern landscapes.
7234.D1.5	Describe the growth characteristics of major herbaceous plant groups and their use in various landscape situations.
7234.D1.6	Demonstrate the proper techniques of planting, watering, fertilizing, and pruning herbaceous landscape plants.
Domain	***Woody Landscape Plants***
7234.D2.1	Identify major ornamental trees by their leaves, bark, buds, and seeds
7234.D2.2	Identify major ornamental shrubs by their leaves and flowers
7234.D2.3	Explain the cultural requirements of woody ornamental plants in Midwestern landscapes
7234.D2.4	Describe cultural requirements of major native and exotic woody ornamental plants
7234.D2.5	Evaluate trees and shrubs for specific site requirements
7234.D2.6	Demonstrate proper installation and maintenance techniques for trees and shrubs
Domain	***Additional***
7234.D3.1	Understand fundamentals of residential and commercial landscape design
7234.D3.2	Demonstrate knowledge of drafting techniques in landscape design, such as using basing CAD operation.
7234.D3.3	Develop a portfolio of work

Agriculture Precision Agriculture							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7117	Principles of Agriculture	7116	Precision Agriculture	7113	Crop Management	7236	Precision Agriculture Capstone
						7238	Agribusiness Capstone

Principles of Agriculture		
Career Cluster	Agriculture	
Program of Study	Ag Mechanical and Engineering, Agri-Science – Plants or Animals, Horticulture, Landscaping, Natural Resources, Precision Agriculture	
NLPS Sequence	A	
Course Code	7117	
Course Description	*Principles of Agriculture is a two-semester course that will cover the diversity of the agricultural industry and agribusiness concepts. Students will develop an understanding of the role of agriculture in the United States and globally. Students will explore Agriculture, Food, and Natural Resource (AFNR) systems related to the production of food, fiber and fuel and the associated health, safety and environmental management systems. Topics covered in the course range from animals, plants, food, natural resources, ag power, structures and technology, and agribusiness. Participation in FFA and Supervised Agricultural Experiences (SAE) will be an integral part of this course in order to develop leadership and career ready skills.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Occupational Specialist I, II, or III in related course approved for a CTE pathway with a	

	balance of all Agriculture relatable subject matter
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Agribusiness Management ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
REPA/REPA 3	● CTE: Agriculture 9-12 ● Workplace Specialist: Agribusiness 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 100: Introduction to Agriculture; AGRI 102: Agricultural Business and Farm Management
VU Course Alignment	AGBS 101: Introduction to Agribusiness Management
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Urban Horticulture (1.0601), CT Landscaping Technician (1.0605), TC Precision Agriculture Specialist (1.0201) VU - CG Agribusiness (1.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***AFNR Systems***
7117.D1.1	Describe the role of agriculture in US and global societies through the domestication and distribution of the world's important crop and livestock species.
7117.D1.2	Recognize the diversity of AFNR systems in the US and the world.
7117.D1.3	Understand the size and productivity of farms and ranches in the US and around the world.
7117.D1.4	Understand US production systems for major grain crops, including Crop Rotation Systems, Tillage Systems, Variety Selection, and Harvest and grain storage technology.
7117.D1.5	Understand US production systems for major livestock animals.
7117.D1.6	Research, examine, and discuss issues and trends that impact AFNR systems on local, state, national and global levels.
7117.D1.7	Examine technologies and analyze their impact on AFNR systems.
Domain	***Agribusiness***
7117.D2.1	To have students develop an understanding of how economics relates to agriculture, and how economic principles are used to analyze and solve problems in agriculture and agribusiness.
7117.D2.2	To have students understand the structure of the U.S. Agriculture and how agriculture interacts with the aggregate economic system.

7117.D2.3	To have students recognize the role of producers, input suppliers, food marketing organizations, and consumers in the U.S. Agricultural economy.
7117.D2.4	Help students understand the qualities and characteristics employers in agribusiness expect in prospective employees and how students can develop those qualities and characteristics.
7117.D2.5	Describe the diversity of jobs and careers in agricultural industries in Indiana and the US.
Domain	***Safety, Health, and Environment Management Systems***
7117.D3.1	Identify and explain the implications of required regulations to maintain and improve safety, health, and environmental management systems.
7117.D3.2	Summarize the importance of safety, health, and environmental management in the workplace.
7117.D3.3	Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.
Domain	***Supervised Agriculture Experience (SAE)***
7117.D4.1	Explain the nature of and become familiar with those terms related to an SAE program.
7117.D4.2	Explore the numerous possibilities for an SAE program which a student might develop.
7117.D4.3	Develop an individual SAE program and implementation plan for record keeping skills.
Domain	***Agricultural Business and Farm Management***
7117.D5.1	Discuss the basic principles of management and decision-making as related to both farm and non-farm agribusiness.
7117.D5.2	Apply economic principles to case studies in farm and agribusiness.
7117.D5.3	Understand the major financial statements: what they report, how to interpret and use the data and how they are connected
7117.D5.4	Know the alternatives to meeting needs when resource analysis indicates the labor input in a business needs altered. Includes review of resume, interviewing and other job application skills.
7117.D5.5	Identify the best combination of resources to use relative to the enterprises selected for the operation including crop inputs, livestock inputs, machinery and equipment, and farmstead and buildings.
7117.D5.6	Know the alternatives for farm recordkeeping and analysis
7117.D5.7	The student will learn to work with others in a management team to combine a limited number of inputs (price, credit policy, advertising dollars, and quantity ordered) within given parameters to experience the outcomes (profits). Emphasis is placed on the practical application of financial statements for analysis.
Domain	***Career Navigation***
7117.D6.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7117.D6.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7117.D6.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7117.D6.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7117.D7.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being

	prepared, completing tasks, and following safety procedures.
7117.D7.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7117.D7.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7117.D7.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7117.D8.1	Demonstrate computer literacy skills and basic computer functions.
7117.D8.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7117.D8.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7117.D8.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Precision Agriculture		
Career Cluster	Agriculture	
Program of Study	Precision Agriculture	
NLPS Sequence	B	
Course Code	7116	
Course Description	*Precision Agriculture describes the purpose and concepts of precision agriculture and precision farming through classroom and lab-based instruction. It involves understanding and operation of the various precision agriculture tools including GPS, GIS, and VRT. Students will learn how to collect data, analyze data and use the information to make decisions. Provides an understanding and justifications that demonstrate the economic and environmental benefits of precision agriculture. The Precision Agriculture course also incorporates the use of UAVs. Students will demonstrate UAV competency and handling in order to achieve the Part 107 UAS certification.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12	

	● Any Standard Agriculture license ● Occupational Specialist I, II, or III in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
REPA/REPA 3	● CTE: Agriculture 9-12 ● Workplace Specialist: Plant & Soil Science 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	PAET 100: Introduction to Precision Agriculture; PAET 107: Unmanned Aerial Vehicles in Precision Agriculture, PAET 280: CO-OP Internship
VU Course Alignment	VU-EC - AGBS 260: Introduction to Precision Ag ; AGBS 240: Drones/UAS (Unmanned Aircraft Systems)
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Precision Agriculture Specialist (1.0201) VU-EC - CG Agribusiness (1.0101)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; COMM 104: Workplace Communications, IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, COMM 143: Speech, COMP 201: Computers in Business, MATH 102: College Algebra, MATH 103: Quantitative Reasoning, or MATT 109: Business Math, Social Science Elective (3)
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Precision Agriculture***
7116.D1.1	Describe the basic purpose and concepts of precision agriculture.
7116.D1.2	Determine basic principles of the various tools of precision agriculture including GPS, GIS and VRT.
7116.D1.3	Recall basic knowledge of GPS and how it works.
7116.D1.4	Recognize the use of these tools to collect data, analyze data and use the information to make a decision.
7116.D1.5	Describe justifications that demonstrate the economic or environmental benefits of precision agriculture.
7116.D1.6	Locate support resources for the systems
7116.D1.7	Demonstrate proper setup and operation of guidance and documentation systems.
Domain	***Unmanned Aerial Systems***
7116.D2.1	Describe the benefits of UAVs operation in the Precision Agriculture industry.

7116.D2.2	Differentiate between multi-rotor and fixed wing aircraft and determine flight operating characteristics.
7116.D2.3	Demonstrate safe flight operation of an UAV.
7116.D2.4	Understand the rules and regulations of operating a drone/UAS
7116.D2.5	Understand sensors and data used in various industry monitoring (RGB, NIR, NDVI and Contour Mapping)
7116.D2.6	Decipher lighting conditions for best sensor imaging results
7116.D2.7	Practice flying exercises in gathering, processing, and delivering the data to the client applying commonly used software programs
7116.D2.8	Choose the correct imagery for the mission.

Crop Management		
Career Cluster	Agriculture	
Program of Study	Precision Agriculture	
NLPS Sequence	C	
Course Code	7113	
Course Description	*Crop Management will provide an understanding of plant nutrient requirements and how to provide for those needs to achieve efficient crop production through classroom and lab-based instruction. Students will understand proper fertilizer materials, application methods and techniques. Instruction on soil analysis by demonstrating proper soil testing techniques which will be used to create fertility plans for proposed crops. Integrated pest management and the evaluation of various pest controls with minimal impact on the environment will also be an emphasis of the course.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Agriculture 9-12	
Rules 2002	● CTE: Agriculture with high school setting	

	● Workplace Specialist: Agriculture Education in Plant & Soil Science
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Plant & Soil Science 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 117: Soil Science; AGRI 217: Soil Fertility
VU Course Alignment	AGBS 110: Integrated Pest Management VU-EC - AGBS 254: Nutrient Management
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Precision Agriculture Specialist (1.0201) VU/EC - CG Agribusiness (1.0101)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; COMM 104: Workplace Communications, IVYT: 113 Student Success in Technology VU - ENGL 101: English Composition I, COMM 143: Speech, COMP 201: Computers in Business, MATH 102: College Algebra, MATH 103: Quantitative Reasoning, or MATT 109: Business Math, Social Science Elective (3)
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Soil Science***
7113.D1.1	Understanding applied chemical, physical, and biological concepts related to soil.
7113.D1.2	Understanding of the origin, classification, and distribution of soils and their relationship to people and food production.
7113.D1.3	Understanding of the fertility management and conservation of soils.
7113.D1.4	Understand the environmental impact of soil use.
Domain	***Nutrient Management***
7113.D2.1	Understanding plant nutrient requirements and how to provide for those needs to achieve efficient crop production.
7113.D2.2	Use concepts and principles to calculate nutrient needs of the soil and the proposed crop
7113.D2.3	Analyze the soil pH and calculate the lime needs of the soil and proposed crop
7113.D2.4	Calculate the various decision impacts on profits
7113.D2.5	Know common fertilizer materials.
7113.D2.6	Understand proper fertilizer application methods and techniques.
7113.D2.7	Create fertility plans for corn, soybean, wheat, and alfalfa production.
7113.D2.8	Recognize the 17 chemical elements
7113.D2.9	Read and interpret soil analysis
7113.D2.10	Explain and demonstrate proper techniques for taking soil test
Domain	***Pest Management***
7113.D3.1	Apply the fundamentals of plant identification as they relate to weeds, diseases, and insects.

7113.D3.2	Identify the most prevalent weeds found in Indiana.
7113.D3.3	Identify the most prevalent insects in Indiana.
7113.D3.4	Identify the most prevalent plant disease in Indiana.
7113.D3.5	Categorize pesticides and growth regulators according to their toxicity to warm blooded animals, fish, and bees.
7113.D3.6	Use chemical information to evaluate the various controls of pests with minimal impact on the environment and beneficial insects, pathogens, and animals present.
7113.D3.7	Outline a schedule of safety procedures to be followed when using pesticides.
7113.D3.8	Identify the pests associated with crop loss
7113.D3.9	Determine when plant pest control measures are necessary.
7113.D3.10	Estimate the proportion of the crop affected.
7113.D3.11	Estimate the economic losses to be expected if control measures are not used.
7113.D3.12	Estimate cost of control measures. Describe the nature of concepts of working capital, analysis of cash, and cash flow from operations.

Precision Agriculture Capstone		
Career Cluster	Agriculture	
Program of Study	Precision Agriculture	
NLPS Sequence	D	
Course Code	7236	
Course Description	*The Precision Agriculture Capstone course builds upon the knowledge and skills developed in the Principles, Precision Agriculture and Crop Management by developing advanced skills that students can apply to the field. As a capstone course, students should have the opportunity to apply their knowledge and use skills through an intensive work-based learning experience.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture; Precision Agriculture; Crop Management	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits max	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Occupational Specialist I, II, or III in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter	

Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
REPA/REPA 3	● CTE: Agriculture 9-12 ● Workplace Specialist: Plant & Soil Science 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 111: Introduction to Crop Production*; PAET 201: GPS Guidance Systems*; PAET 202: Application Control*; PAET 222: Precision Agriculture Applications of Geographic Information Systems*; PAET 280: CO-OP Internship
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Precision Agriculture Specialist (1.0201)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, COMM 104: Workplace Communications, IVYT 113: Student Success in Technology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Crop Production***
7236.D1.1	Explain aspects of U.S. agricultural production.
7236.D1.2	Describe major types of cropping systems.
7236.D1.3	Explain how soils influence crop production.
7236.D1.4	Explain hybrid and variety development, and influence of GM technology on crop production.
7236.D1.5	Formulate crop fertilizer recommendations based on soil test results, and design appropriate application techniques including correct timing and placement
7236.D1.6	Describe field crop physiology, growth, and development.
7236.D1.7	Develop tillage and crop management systems.
7236.D1.8	List characteristics of sustainable agriculture systems.
7236.D1.9	Learn about interaction between common crop production practices and environmental quality
7236.D1.10	Understand how crop fertilizer recommendations are generated
7236.D1.11	Learn about appropriate application of technological advances in agronomy to current crop production systems
7236.D1.12	Understand the interaction among common crop production practices, agricultural sustainability, and environmental quality
7236.D1.13	Employ scientific concepts to address issues facing the food, agriculture, and natural resource

	system
Domain	***GPS Guidance Systems***
7236.D2.1	Demonstrate competency in GPS constellation and signal frequency
7236.D2.2	Differentiate between communication protocols
7236.D2.3	Describe the level of accuracy necessary for different GPS-controlled guidance systems
7236.D2.4	Differentiate between RTK, CORS, and virtual reference stations
7236.D2.5	Demonstrate competency in installation, setup, and troubleshooting of assisted steering components
7236.D2.6	Demonstrate competency in installation, setup, and troubleshooting integrated steering systems
Domain	***Application Controls***
7236.D3.1	Demonstrate the use and functionality of rate controllers
7236.D3.2	Demonstrate the use and functionality of overlap control
7236.D3.3	Identify pumps, valves, and solenoids
7236.D3.4	Demonstrate competency in sprayer nozzle selection
7236.D3.5	Describe the equipment used in precision planting systems
7236.D3.6	Describe the equipment used in precision harvesting systems
Domain	***Ag Application of GIS***
7236.D4.1	Outline the objectives of using a geographic information system.
7236.D4.2	Explain the special GIS considerations of precision agriculture data and processing, such as encoding and import/export.
7236.D4.3	Demonstrate the ability to develop and manipulate a database.

Agribusiness Capstone	
Career Cluster	Agriculture
Program of Study	Precision Agriculture
NLPS Sequence	D
Course Code	7238
Course Description	*Agribusiness Management Capstone course is a two semester course that introduces students to the Principles of agribusiness management and leadership from a local and global perspective, with the utilization of technology. The course will help students build a strong knowledge base of the agribusiness industry as they study agribusiness types, communications, agricultural law, leadership, and teamwork, ethics, and agricultural economics. Additionally, students will understand the role of selling in the agricultural economy, stressing the points and terminology necessary in today's agriculture. Students will demonstrate principles and techniques for planning, development, application and management of agribusiness systems through project-based learning and a supervised agriculture experience (work-based learning) programs.*
Prerequisite(s)/	Any Agriculture Concentrator Sequence

Corequisite(s)		
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Agriculture 9-12	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Agribusiness Management	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Agribusiness 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment	AGBS 152: Agricultural Sales ; AGBS 130: Agribusiness Leadership and Development	
Four Yr. Course Alignment		
Postsecondary Credential	VU - CG Agribusiness (1.0101)	
Liberal Arts/Sciences Requirements	VU - ENGL 101: English Composition I, COMM 143: Speech, COMP 201: Computers in Business, MATH 102: College Algebra, MATH 103: Quantitative Reasoning, or MATT 109: Business Math, Social Science Elective (3)	
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Agriculture Sales***	
7238.D1.1	Understand the many possible situations of full-time sales and other sales employment opportunities.	
7238.D1.2	Develop a marketing video for their major	
7238.D1.3	Enhance communication skills and build a foundation understanding why we buy products	
7238.D1.4	Execute sales skills and techniques by an actual sale made to current sales representatives	
7238.D1.5	Analyze sales presentations to understand the sales process	

Domain	Agriculture Leadership and Management
7238.D2.1	Recognize the value of leadership in the agribusiness industry.
7238.D2.2	Read and interpret how leaders impact today's agribusiness.
7238.D2.3	Research leadership styles and how they have changed in the past.
7238.D2.4	Explain the importance of communication skills in agribusiness.
7238.D2.5	Understand the importance of teamwork in workgroups.
7238.D2.6	Analyze the effects of leadership decisions on the performance of a company and its human resources.
7238.D2.7	Perform positively in group situations to solve a variety of cases and analytical situations.
7238.D2.8	Understand the importance of continuing life-long learning for employment.
7238.D2.9	Develop problem-solving skills within a case-study context.
7238.D2.10	Demonstrate ability to synthesize agribusiness acumen.
7238.D2.11	Discuss agribusiness decisions and their outcomes and their impact on future business decisions.
7238.D2.12	Develop an analysis of a business simulation over 8 years.
7238.D2.13	Present a presentation of the analysis of the business performance for stockholders.

Agriculture Veterinary Science							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7280	Principles of Veterinary Science	7281	Veterinary Science	5070	Advanced Life Sciences, Animals	7282	Veterinary Science Capstone

Principles of Veterinary Science		
Career Cluster	Agriculture	
Program of Study	Veterinary Science	
NLPS Sequence	A	
Course Code	7280	
Course Description	*Principles of Veterinary Science is a two-semester course that provides students with an overview of the small and large animal veterinary industry which includes companion, food, and exotic animals. Principles of Veterinary Science will cover skills common to specific veterinary career topics such as animal care, veterinary assistant, veterinary technician, and veterinarian. Students will learn foundational veterinary knowledge for large and small animals which includes practical lab skills and common office practices.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No license available	
Rules 46-47	● No license available	
Rules 2002	● Workplace Specialist: Veterinary ● CTE: Agriculture with Veterinary Experience	
REPA/REPA 3	● Workplace Specialist: Veterinary 9-12 ● CTE: Agriculture with Veterinary Experience	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		

VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	NAVTA

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Foundational Vet Knowledge***
7280.D1.1	Identify the basic anatomy and physiology of animals
7280.D1.2	Understand what normal physiology is including theriogenology (reproduction)
7280.D1.3	Analyze veterinary terms as to their meanings and recognize common prefixes, suffixes, and roots
7280.D1.4	Know the medical terminology relating to the organism and the position
7280.D1.5	Develop appropriate use of directional terms
7280.D1.6	Describe anatomical structures and body systems by using appropriate medical terminology
7280.D1.7	Recognize, pronounce, spell, and define medical terms relating to diagnosis, pathology, and treatment of animals
7280.D1.8	Demonstrate mathematical skills for client assessment and treatment
7280.D1.9	Convert, calculate, and analyze problems as it relates to veterinary medicine
7280.D1.10	Interpret data such as tables, charts, and graphs
7280.D1.11	Recognize the importance of animals in our society and explain the human-animal bond
7280.D1.12	Identify trends, issues, and historical events that have influenced animal use and care
7280.D1.13	Describe the legal aspects of animal welfare and animal rights; in addition, evaluate the principles of veterinary medical ethics
7280.D1.14	Develop knowledge and practical skills in the area of animal behavior and communication
7280.D1.15	Recognize behaviors and communications related to illness and reproduction
Domain	***Basic Office and Hospital Procedures***
7280.D2.1	Practice techniques for communicating with the veterinary medical team and client
7280.D2.2	Understand ethical conduct in relationship to the day-to-day operations of a vet hospital
7280.D2.3	Demonstrate knowledge of basic cleaning techniques of animal kennels and bedding, examination rooms, hospital facilities, and surgical suites
7280.D2.4	Practice procedures for care, maintenance, and use of diagnostic, therapeutic, surgical, and anesthetic equipment, and supplies
7280.D2.5	Determine and record temperature, pulse, respiration, body condition score, and weight of patients
7280.D2.6	Demonstrate knowledge of basic normal and abnormal animal behavior and describe the characteristics and signs of a healthy animal
7280.D2.7	Utilize patient & personnel safety measures and discuss emergency procedures

7280.D2.8	Be familiar with OSHA regulations and understand the types of hazards common in the veterinary practice
7280.D2.9	Place and remove small animals from cages and place and restrain small animals on tables and floor • Apply dog and cat safety muzzle • Apply Elizabethan collar • Apply restraint pole • Demonstrate standing, sitting, and lateral restraint positions • Recognize when to alter normal restraint for compromised patients in the exam room (i.e., Ringworm, Contagious diseases, Ectoparasite infestation) and describe appropriate action or personnel to notify
7280.D2.10	Restrain birds, rabbits, pocket pets, and exotics (Optional)
7280.D2.11	Restrain large animals (Optional) • Halter, tie, and lead horses • Restrain cattle & horses • Apply twitch • Apply nose tongs/ leads • Restraint of sheep & swine • Load large animals
Domain	***Career Navigation***
7280.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7280.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7280.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7280.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7280.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7280.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7280.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7280.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7280.D5.1	Demonstrate computer literacy skills and basic computer functions.
7280.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7280.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7280.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Veterinary Science		
Career Cluster	Agriculture	
Program of Study	Veterinary Science	
NLPS Sequence	B	
Course Code	7281	
Course Description	*Veterinary Science is a two-semester course that provides students with opportunities to participate in a variety of activities including laboratory work. Students will explore concepts related to medical terminology, laboratory procedures, clinical examination procedures, principles of animal diseases, as well as work in veterinary clinic management and veterinary law and ethics.*	
Prerequisite(s)/ Corequisite(s)	Principles of Veterinary Science	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No license available	
Rules 46-47	● No license available	
Rules 2002	● Workplace Specialist: Veterinary ● CTE: Agriculture with Veterinary Experience	
REPA/REPA 3	● Workplace Specialist: Veterinary 9-12 ● CTE: Agriculture with Veterinary Experience	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications	NAVTA	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Pharmacy and Pharmacology***
7281.D1.1	Know the Legal requirements and procedures for preparing, storing, and dispensing pharmacological and biological agents
7281.D1.2	Classify the common drugs used in veterinary medicine know the toxicology of the commonly used drugs and identify the contraindications, side effects, and normal and abnormal drug reactions and interactions
7281.D1.3	Use basic medical terminology and be able to simplify the terminology for the client
7281.D1.4	Understand the various routes of administration of pharmacological and biological agents (including vaccines) and identify the equipment used to administer medications, including restraints
7281.D1.5	Label and package dispensed drugs correctly
7281.D1.6	Store, safely handle and dispose of biological and therapeutic agents, pesticides, and hazardous waste
7281.D1.7	Explain the proper methods of disposal for syringe, needles, and other sharp objects
7281.D1.8	Perform inventory control procedures including restocking supplies and checking expiration dates
Domain	***Exam Room Procedures***
7281.D2.1	Express anal sacs using the external method
7281.D2.2	Identify external parasites: mites, lice, fleas, and ticks
7281.D2.3	Recognize AKC dog breeds and CFA cat breeds
7281.D2.4	Be able to properly identify the gender of small animal species, particularly felines
7281.D2.5	Perform exam room grooming (i.e., trimming nails, external ear canal cleaning, etc.)
Domain	***Small Animal Nursing***
7281.D3.1	Define zoonosis and identify potential zoonotic diseases
7281.D3.2	Practice isolation procedures
7281.D3.3	Define the process of hazardous waste disposal
7281.D3.4	Describe and perform basic sanitation
7281.D3.5	Perform and document initial and ongoing evaluations of physical, behavioral, nutritional, and environmental status of animals to provide for optimal animal/client safety and health • Animal assessment and monitoring techniques, including but not limited to surgery, hospitalization, physical exam, and excluding anesthetic monitoring • Understand the principles of animal behavior • Demonstrate a basic understanding of common diseases and medical conditions and recognize signs and symptoms that may indicate disease or illness
7281.D3.6	Perform animal nursing and clinical diagnostic procedures (including but not limited to post-operative care, catheterization, wound management, blood pressure measurement, electrocardiography) to aid in diagnosis, prognosis, and implementation of prescribed treatments Clinical diagnostic procedures, including but not limited to blood pressure measurement, electrocardiography, tonometry • Monitor/restrain patients for fluid therapy and record observations • Demonstrate understanding of treatment plan
7281.D3.7	Animal nursing procedures including, but not limited to, pre/post-operative care technique,

	casting, bandaging. • Apply and remove bandages to healthy animals - (equine leg and tail wraps - optional) • Perform hand pilling (dog, cat) • Perform therapeutic bathing, basic grooming, and dipping of small animals • Clean external ear canals • Prepare food & prescription diets - be aware of any special dietary needs
7281.D3.8	Practice animal first aid, triage, and emergency/critical care techniques
7281.D3.9	Provide a safe, sanitary, and comfortable environment for animals to ensure optimal healthcare and client/personnel safety. • Animal handling and restraint techniques • Animal husbandry • Disease control and prevention techniques (including but not limited to vaccination, wellness care, herd health) • Facility cleaning and disinfection techniques
7281.D3.10	Demonstrate an understanding of euthanasia and postmortem care

Advanced Life Science, Animals (L)	
Career Cluster	Agriculture
Program of Study	Agriscience; Veterinary Science
NLPS Sequence	C; B
Course Code	5070
Course Description	*Advanced Life Science: Animals is a two-semester course that provides students with opportunities to participate in a variety of activities including laboratory work. Students will explore concepts related to history and trends in animal agriculture as related to animal welfare, husbandry, diseases and parasites, laws and practices relating to handling, housing, environmental impact, global sustainable practices of animal agriculture, genetics, breeding practices, biotechnology uses, and comparative knowledge of anatomy and physiology of animals used in animal agriculture.*
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture; or Principles of Veterinary Science
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Fulfills a science requirement for CORE 40 diplomas Counts as a quantitative reasoning course for CORE 40 diplomas Counts as STEM-Focused credit for new diploma Counts as Science Credit for new diploma
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	

Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12 ● Science/Biology 9-12 ● Workplace Specialist: Agriculture Education in Animal Science	
Rules 46-47	● Vocational Agriculture K-12 ● Any Standard Agriculture license ● Biology 9-12 ● Any Occupational Specialist I, II, or III: Agriculture 9-12 ● Workplace Specialist: Agriculture Education in Animal Science	
Rules 2002	● CTE: Agriculture with high school setting ● Life Science with high school setting ● Workplace Specialist: Veterinary ● Workplace Specialist: Agriculture Education in Animal Science	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Life Science 5-12 ● Workplace Specialist: Veterinary ● Workplace Specialist: Agriculture Education in Animal Science	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	AGRI 107: Advanced Animal Science	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Historic and Current Trends Impacting the Animal Systems Industry***	
5070.D1.1	Evaluate the development and implications of animal origin, domestication and distribution and assess animal production methods for use in animal systems based on effectiveness.	
5070.D1.2	Evaluate the implications of animal adaptations on production practices and the environment.	
5070.D1.3	Predict trends and implications of future developments within different animal industries on production practices and the environment.	
5070.D1.4	Evaluate the effectiveness of different production methods and defend the use of selected methods using data and evidence.	

5070.D1.5	Devise and evaluate marketing plans for an animal agriculture product or service.
5070.D1.6	Select and defend the use of a specific record management system based upon its effectiveness for a business related to animal systems.
5070.D1.7	Devise and evaluate plans to manage wildlife populations to achieve optimal ecological health.
Domain	***Global Perspective of Laws and Sustainability***
5070.D2.1	Analyze and apply laws and sustainable practices to animal agriculture from a global perspective.
5070.D2.2	Evaluate the impact of laws pertaining to animal agriculture (e.g., pros, cons, effect on individuals, effect on businesses, etc.) and assess the compliance of production practices with established regulations.
5070.D2.3	Select, evaluate, and defend the use of sustainable practices in animal agriculture.
Domain	***Animal Husbandry and Welfare***
5070.D3.1	Demonstrate management techniques that ensure animal welfare and analyze procedures to ensure safety of animal products.
5070.D3.2	Implement and evaluate quality-assurance programs and procedures for animal production.
5070.D3.3	Devise, implement and evaluate safety procedures and plans for working with animals by species using information based on animal behavior and responses.
5070.D3.4	Devise economic recommendations to increase the welfare of animals in animal systems.
5070.D3.5	Select, evaluate, and defend the use of specific tools, technology or equipment used to perform animal husbandry and welfare tasks.
5070.D3.6	Research and evaluate programs to assure the safety of animal products for consumption.
5070.D3.7	Evaluate the effectiveness of animal and/or premise identification programs for a given species.
Domain	***Animal Nutrition***
5070.D4.1	Analyze the nutritional requirements of animals and analyze feed rations to assess their effectiveness
5070.D4.2	Assess nutritional needs for an individual animal based on its growth stage and production system.
5070.D4.3	Design and defend the use of a nutritional program by demonstrating the relationship between the nutrient requirements and the feedstuffs provided.
5070.D4.4	Identify essential and non-essential nutrients. In addition, describe the relationship between amino acids, vitamins, and minerals in the health of cells and organs.
5070.D4.5	Select appropriate feed stuffs for animals based on a variety of factors (e.g., economics, digestive system and nutritional needs, etc.).
5070.D4.6	Select and utilize animal feeds based on nutritional requirements, using rations for maximum nutrition and optimal economic production.
5070.D4.7	Make and defend decisions regarding whether to use feed additives and growth promotions after researching and considering scientific evidence, production system needs and goals, and input from industry professionals.
5070.D4.8	Select, evaluate, and defend the use of specific tools or equipment used to perform animal nutrition tasks.
5070.D4.9	Evaluate and summarize the potential impacts, positive and negative, of compliance and/or noncompliance with a feed label and feeding directions.
5070.D4.10	Research and recommend technological improvements to provide proper nutrition for

	animals.
Domain	***Animal Reproduction***
5070.D5.1	Students evaluate animals for breeding readiness and soundness and apply scientific principles to select and care for breeding animals.
5070.D5.2	Select breeding animals based on characteristics of the reproductive organs.
5070.D5.3	Evaluate and select animals for reproductive readiness.
5070.D5.4	Treat or cull animals with reproductive problems.
5070.D5.5	Summarize the process of sexual maturation
5070.D5.6	Identify and discuss various breeding systems in domesticated animals
5070.D5.7	Describe the function of the animal/host defense mechanism
5070.D5.8	Discuss the direct and indirect impact of disease on animal health
5070.D5.9	Compare and contrast the reproductive organs for male and female domesticated animal species.
5070.D5.10	Describe ectoderm, endoderm, and mesoderm as three germ layers that give rise to tissues and organs. Describe blastula and gastrula formation, and the function of morphogens, and recognize their importance in the developmental processes of vertebrates.
5070.D5.11	Define and describe estrous cycle(s). Describe how hormones act during the estrous cycle and how they are used to suppress it.
5070.D5.12	Discuss the social implications of reproductive and genetic technologies used in animal husbandry (e.g., embryo transfer, artificial insemination, gene transfer, cloning).
5070.D5.13	Describe spermatogenesis and sperm motility. List and explain factors that affect both.
5070.D5.14	Describe the steps in lactation.
5070.D5.15	Describe parturition and the method(s) used to predict when it occurs.
5070.D5.16	Select and evaluate a breeding system based on the principles of genetics.
5070.D5.17	Select and evaluate breeding animals and determine the probability of a given trait in their offspring.
5070.D5.18	Perform a DNA analysis and use the data to make and defend breeding decisions.
5070.D5.19	Create a plan to differentiate care of a species of breeding animals throughout their growth stages.
5070.D5.20	Describe ways that animals prevent inbreeding and discuss genetic diversity.
5070.D5.21	Compare and contrast natural selection with artificial selection, as used by humans to domesticate animals and breed improved varieties.
5070.D5.22	Compare and contrast adaptations of animals for survival in different environmental conditions.
5070.D5.23	Describe the role of biotechnology in the process of selection.
5070.D5.24	Explain the science behind mammalian cloning. Compare and contrast cloning a gene and an animal.
5070.D5.25	Describe the relationship between genotype and phenotype.
5070.D5.26	Select animal breeding methods based on reproductive and economic efficiency.
5070.D5.27	Evaluate the implementation and effectiveness of artificial insemination techniques.
5070.D5.28	Create and evaluate plans and procedures for estrous synchronization, superovulation, flushing, embryo transfer and other reproductive management practices.
5070.D5.29	Select and assess animal performance based on quantitative breeding values for specific characteristics.
Domain	***Animal Environmental Considerations***

5070.D6.1	Students design animal housing, equipment, and handling facilities for the major systems of animal production that comply with government regulations and safety standards.
5070.D6.2	Design an animal facility focusing on animal requirements, economic efficiency, sustainability, safety, and ease of handling.
5070.D6.3	Select, use, and evaluate equipment, technology, and handling procedures to enhance sustainability and production efficiency.
5070.D6.4	Evaluate facility designs and make recommendations to ensure that it meets standards for the legal, safe, ethical, economical, and efficient production of animals.
5070.D6.5	Evaluate the impact of laws pertaining to animal systems.
Domain	***Animal Classification, Anatomy, & Physiology***
5070.D7.1	Students classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).
5070.D7.2	Assess taxonomic characteristics and classify animals according to the taxonomic classification system.
5070.D7.3	Recommend different uses for an animal species based upon an analysis of local market needs.
5070.D7.4	Apply knowledge of classification terms to communicate with others about animal systems in an effective and accurate manner.
5070.D7.5	Define the terms hypertonic, hypotonic, and isotonic. Describe the phenomena of osmosis, and predict the direction that water will move given the concentrations of solutes in adjacent cells.
5070.D7.6	Describe the biochemistry and functions of animal cell membranes. In doing so, describe the fluid mosaic model of the membrane and the role of the cell membrane proteins in transporting materials in and out of cells.
5070.D7.7	Describe cellular respiration. Recognize that animals perform only respiration, while plants perform both photosynthesis and respiration. Also, describe the transformation of energy during respiration, and the role of ATP produced in respiration for other metabolic processes.
5070.D7.8	Students apply principles of comparative anatomy and physiology to uses within various animal systems.
5070.D7.9	Correlate the functions of animal cell structures to animal growth, development, health, and reproduction.
5070.D7.10	Apply the processes of meiosis and mitosis to solve animal growth, development, health and reproductive problems.
5070.D7.11	Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions.
5070.D7.12	Compare and contrast muscle function under anaerobic and aerobic conditions
5070.D7.13	Identify and explain the major organ systems found in vertebrae systems (Muscular, Skeletal, Circulatory, Respiratory, Digestive, Nervous, Endocrine, Integumentary, Excretory, Urinary, Immune)
5070.D7.14	Describe the organization of the animal body, cells, tissues, organs, and organ systems
5070.D7.15	Discuss four basic tissue types: epithelial, connective, muscle, and nervous
5070.D7.16	Students select and train animals for specific purposes and maximum performance based on anatomy and physiology.
5070.D7.17	Evaluate and select animals to maximize performance based on anatomical and physiological characteristics that affect health, growth, and reproduction

5070.D7.18	Choose, implement, and evaluate sustainable and efficient procedures (e.g., selection, housing, nutrition, and management) to produce consistently high-quality animals that are well suited for their intended purposes.
5070.D7.19	Evaluate and select animals to produce superior animal products based on industry standards.
Domain	***Animal Health***
5070.D8.1	Students design programs to prevent animal diseases, parasites and other disorders and ensure animal welfare.
5070.D8.2	Select and use tools and technology to meet specific animal health management goals.
5070.D8.3	Determine when an animal health concern needs to be referred to an animal health professional.
5070.D8.4	Treat common diseases, parasites, and physiological disorders of animals according to directions prescribed by an animal health professional.
5070.D8.5	Design and implement health maintenance and a disease and disorder prevention plan for animals in their natural and/or confined environments.
5070.D8.6	Identify and describe surgical and nonsurgical veterinary treatments and procedures to meet specific animal health care objectives.
5070.D8.7	Describe the function of the animal/host defense mechanism
5070.D8.8	Describe the use of antibiotics in animal health and describe how antibiotics work. Discuss the impact improper use of antibiotics has on antibiotic resistance.
5070.D8.9	Discuss the role of blood in host defense
5070.D8.10	Discuss the impact of disease on animal health.
5070.D8.11	Describe the various parasites and their impact on organ systems. Discuss host specificity and the importance of it.
5070.D8.12	Students analyze biosecurity measures utilized to protect the welfare of animals on a local, state, national, and global level.
5070.D8.13	Design and evaluate a biosecurity plan for an animal production operation.
5070.D8.14	Research and evaluate the effectiveness of zoonotic disease prevention methods and procedures to identify those that are best suited to ensure public safety and animal welfare.
Domain	***Environmental Impacts of Animal Production***
5070.D9.1	Design and implement methods to reduce the effects of animal production on the environment.
5070.D9.2	Devise a plan that includes measures to reduce the impact of animal agriculture on the environment.
5070.D9.3	Apply valid and reliable research evidence to predict the potential effects of different environmental conditions for an animal population.
5070.D9.4	Devise and improve plans to establish favorable environmental conditions for animal growth and performance based on a variety of factors (e.g., economic feasibility, environmental sustainability, impact on animals, etc.).
Domain	***Leadership***
5070.D10.1	Students validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education.
5070.D10.2	Communicate clearly, effectively, and with reason through speaking, writing, visuals, and active listening in formal and informal settings
5070.D10.3	Recognize and explain the role of the FFA in the development of leadership, education,

	employability, communications, and human relations skills
5070.D10.4	Examine roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment
5070.D10.5	Acquire the skills necessary to positively influence others
5070.D10.6	Develop a skill set to enhance the positive evolution of the whole person
Domain	***Supervised Agriculture Experience***
5070.D11.1	Students validate the necessity of a Supervised Agricultural Experience (SAE) program as a critical component to a well-rounded agricultural education.
5070.D11.2	Explain the nature of and become familiar with those terms related to an SAE program
5070.D11.3	Explore the numerous possibilities for an SAE program which a student might develop
5070.D11.4	Develop an individual SAE program and implementation plan for record keeping skills
Domain	***Careers***
5070.D12.1	Students examine the scope of career opportunities and the importance of agriculture to the economy.
5070.D12.2	Evaluate the nature and scope of animal sciences in agriculture, society, and the economy
5070.D12.3	Describe career opportunities and means to achieve those opportunities in animal science
5070.D12.4	Explain the nature of and become familiar with those terms related to an SAE program
5070.D12.5	Explore the numerous possibilities for an SAE program which a student might develop

Veterinary Science Capstone		
Career Cluster	Agriculture	
Program of Study	Veterinary Science	
NLPS Sequence	D	
Course Code	7282	
Course Description	*Veterinary Science Capstone is a two-semester course that builds upon the knowledge and skills developed in the animal and veterinary courses by developing advanced skills that students can apply to the field. As a capstone course, students should have the opportunity to apply their knowledge and use skills through an intensive work-based learning experience. Students will explore concepts related to pharmacy and pharmacology, medical math, animal nursing, radiology and ultrasound imaging, surgical preparation and assisting*	
Prerequisite(s)/ Corequisite(s)	Principles of Veterinary Science; Advanced Life Science: Animals; Veterinary Science	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II

Bulletin 400	● No license available
Rules 46-47	● No license available
Rules 2002	● Workplace Specialist: Veterinary ● CTE: Agriculture with Veterinary Experience
REPA/REPA 3	● Workplace Specialist: Veterinary 9-12 ● CTE: Agriculture with Veterinary Experience
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	NAVTA
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Vet Office and Hospital Procedures***
7282.D1.1	Greet Clients and demonstrate proper appointment scheduling and make appointments
7282.D1.2	Prepare appropriate certificates for client's signature and perform basic veterinary medical record keeping procedures
7282.D1.3	Admit patient following the established policies of the veterinary setting
7282.D1.4	Demonstrate proficiency with typing and computer skills
7282.D1.5	Utilize basic medical terminology
7282.D1.6	Perform basic invoicing, billing, and payment on account procedures
7282.D1.7	Inventory supplies on a regular schedule and restock shelves
7282.D1.8	Maintain x-ray, surgery, and laboratory logs
7282.D1.9	Perform basic filing and retrieving of medical records, radiographs, lab reports, etc.
Domain	***Surgical Preparation and Assisting***
7282.D2.1	Prepare and maintain the surgical environment, equipment, instruments, and supplies to meet the needs of the surgical team and patient. • Practice sterilization techniques and quality assurance for equipment and supplies
7282.D2.2	Prepare patient for procedure, including surgical site scrub and patient positioning • Perform patient positioning techniques including but not limited to diagnostic imaging,

	surgery
7282.D2.3	Function as a sterile surgical assistant, including but not limited to aiding in tissue handling, suturing, instrument handling, to ensure patient safety and procedural efficiency • Practice aseptic technique • Understand and perform basic surgical procedures • Recognize suturing methods and techniques • Maintain fluid balance and therapy
7282.D2.4	Function as a circulating (non-sterile) surgical assistant to ensure patient safety and procedural efficiency. • Practice sterile and circulating (non-sterile) surgical assisting procedures and instrumentation
7282.D2.5	Maintain proper operating room conduct and asepsis
7282.D2.6	Perform post-surgical clean up
7282.D2.7	Fold surgical gowns and drapes
7282.D2.8	Have knowledge of: • Surgical equipment • Surgical room and prep area • Instrument cleaning and care • Proper disposal of hazardous medical wastes
Domain	***Laboratory Procedures***
7282.D3.1	Collect, prepare, and maintain specimens for in-house or outside laboratory evaluation; in addition, practice sample collection, preparation, storing, and shipping techniques • Collect voided urine samples • Determine physical properties of urine including color and clarity • Assist in the collection of blood samples for procedures • Collect voided fecal samples for examination • Prepare fecal flotation solutions and set up fecal flotations and direct smears • Assist the DVM or veterinary technician in necropsy procedures • Explain how to handle rabies suspects & samples safely • Handle disposal of deceased animals
7282.D3.2	Maintain laboratory equipment and supplies to ensure safety and quality of results
7282.D3.3	Evaluate information obtained from gross observation and microscopic examinations as well as interpret test results as they pertain to animal health
7282.D3.4	Understand laboratory diagnostic principles and procedures (e.g., hematology, cytology, urinalysis, serology, immunology, microbiology, parasitology)
7282.D3.5	Ensure all laboratory results are accurately recorded, stock laboratory supplies, and file laboratory reports
Domain	***Radiology and Ultrasound Imaging***
7282.D4.1	Assist the veterinarian and/or the veterinary technician in the completion of diagnostic radiographs and ultrasound including the restraint and positioning of patients
7282.D4.2	Produce diagnostic images following safety protocols for operator and patient.
7282.D4.3	Use hand OR automatic processing in darkroom

7282.D4.4	Maintain imaging equipment and materials to ensure safety and quality of results.
7282.D4.5	Know safety techniques for handling processing chemicals

Agriculture Water Systems							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7381	Principles of Public Water Systems	7382	Water Systems Fundamentals (Treatment)	7383	Advanced Water Systems (Distribution and Storage)	7384	Water Systems Capstone

Principles of Public Water Systems		
Career Cluster	Agriculture	
Program of Study	Water Systems	
NLPS Sequence	A	
Course Code	7381	
Course Description	*Principles of Public Water Systems provides students with the foundational knowledge to operate a public water distribution system. Including an introduction to water systems, rules and regulations, and safety.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less Than Moderate Value	Level I
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education ● CTE: T&I: Public Water System Technician ● Workplace Specialist: Public Water System Technician	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Water Systems Fundamentals***
7381.D1.1	Define the purpose of water.
7381.D1.2	Understand the history of water (e.g., Introduction of Chlorine, Safe Drinking Water Act, Clean Water Act, Health and Safety of Community, etc.).
7381.D1.3	Describe the key regulations and governing organizations of water systems in Indiana.
7381.D1.4	Explore the roles and responsibilities of various jobs in water systems (including earning potential and benefits of pursuing a career in water systems).
7381.D1.5	Demonstrate knowledge of safety precautions and potential hazards for various water systems occupations and workplaces. - Confined Spaces - General safety for water utility workers - Chemical Safety - Safety Data Sheets (SDS) - Personal Protection Equipment (PPE) - OSHA 10 Certification
7381.D1.6	Describe the hydrological cycle.
7381.D1.7	Describe the basic equipment used in water utility careers (e.g., hand tools, backhoes, dump trucks, etc.).
7381.D1.8	Use basic math to solve simple equations (adding, subtracting, multiplying).
7381.D1.9	Understand what a public water system does.
7381.D1.10	Demonstrate understanding of water scarcity and water conservation practices.
Domain	***Career Navigation***
7381.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7381.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7381.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.

7381.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7381.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7381.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7381.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7381.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7381.D4.1	Demonstrate computer literacy skills and basic computer functions.
7381.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7381.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7381.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Water Systems Fundamentals (Treatment)		
Career Cluster	Agriculture	
Program of Study	Water Systems	
NLPS Sequence	B	
Course Code	7382	
Course Description	*Water Systems Fundamentals will include an overview of water treatment systems, specialized treatment processes, disinfection, and water system maintenance.*	
Prerequisite(s)/ Corequisite(s)	Principles of Public Water Systems	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12	

	● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education ● CTE: T&I: Public Water System Technician ● Workplace Specialist: Public Water System Technician
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Water Treatment***
7382.D1.1	Describe the different types of water sources; Ground and Surface.
7382.D1.2	Understand how wells and aquifers work (including wellhead protection).
7382.D1.3	Understand surface water protection processes.
7382.D1.4	Understand ground water quality.
7382.D1.5	Understand surface water quality.
7382.D1.6	Describe the steps for groundwater treatment.
7382.D1.7	Describe the steps for surface water treatment.
7382.D1.8	Describe the equipment used in water treatment labs.
7382.D1.9	Demonstrate knowledge of safety precautions and potential hazards for water treatment.
7382.D1.10	Apply proper techniques to analyze water samples.
7382.D1.11	Identify the different types of aeration used in water treatment.
7382.D1.12	Understand the different types of filters. - Pressure Filters - Gravity Filters - Iron Filters
7382.D1.13	Describe the basic water softening processes.
7382.D1.14	Understand the different applications and uses for valves and pumps in a water treatment

	plant.
7382.D1.15	Develop a general understanding of flow metering.
7382.D1.16	Examine the different types of disinfectants. - Chlorine (tablets, liquid, gas) - Chloramines - Chlorine Dioxide - Ozone - UV Disinfectant
7382.D1.17	List the key steps for water system security.

Advanced Water Systems (Distribution and Storage)		
Career Cluster	Agriculture	
Program of Study	Water Systems	
NLPS Sequence	C	
Course Code	7383	
Course Description	*Advanced Water Systems: Distribution and Storage will focus on water distribution systems and storage tanks including pipes, valves, hydrants, metering, and maintenance.*	
Prerequisite(s)/ Corequisite(s)	Principles of Public Water Systems, Water System Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education ● CTE: T&I: Public Water System Technician ● Workplace Specialist: Public Water System Technician	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course		

Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	
7383.D1.1	Distribution and Storage
7383.D1.2	Understand the different ways distribution systems are designed for various communities. - Aerial Loop - Grid - Tree - Pressure Zones (including booster pumps)
7383.D1.3	Identify the different types of pipes and fittings.
7383.D1.4	Define the different types of valves used in water distribution.
7383.D1.5	Describe the use and maintenance of hydrants.
7383.D1.6	Demonstrate knowledge of safety precautions and potential hazards for water distribution - Trench and Traffic Safety
7383.D1.7	Develop a general understanding of metering (consumptions, meter construction, meter selection, etc.).
7383.D1.8	Understand intermediate math concepts encountered in water systems such as conversions (feet to PSI).
7383.D1.9	Examine distribution system maintenance.
7383.D1.10	Identify the different types of storage tanks and their purposes. - Cathodic Protection Systems - Overflow Pipes - Vents - Manways
7383.D1.11	Explain the different ways to inspect a storage tank (drain, drones).
7383.D1.12	Describe how to properly maintain storage tanks including safety precautions.
7383.D1.13	Describe the Coliform monitoring process.
7383.D1.14	Describe the different types of chemical contaminants. - Inorganic chemicals (IOCs) - Volatile organic compounds (VOCs) - Synthetic organic compounds (SOCs)

	- Nitrate - Lead - Copper - Disinfection Byproducts

Water Systems Capstone		
Career Cluster	Agriculture	
Program of Study	Water Systems	
NLPS Sequence	D	
Course Code	7384	
Course Description	*The Water Systems Capstone course will focus on higher level concepts that operators may be exposed to as they advance in their chosen careers. Courses topics may include Wastewater Treatment, asset management, risk assessment and emergency response training, instrumentation (SCADA & GIS), water audits, construction inspection, water plant administration.*	
Prerequisite(s)/ Corequisite(s)	Principles of Public Water Systems; Water Systems Fundamentals; Advanced Water Systems	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education ● CTE: T&I: Public Water System Technician ● Workplace Specialist: Public Water System Technician	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course		

Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Advanced Concepts***
7384.D1.1	Understand advanced math concepts encountered in water systems such as calculating the area of a storage tank, determining chemical additional dosages and residuals, breakpoint chlorination and demand, and calculating well drawdown.
7384.D1.2	Describe examples of cross connections and backflow prevention.
7384.D1.3	Describe the various ways to control corrosion.
7384.D1.4	Summarize the different types of membrane filtration.
7384.D1.5	Demonstrate accurate water system reporting. - Daily bench sheets - Monthly Report of Operation (MRO) - Department of Natural Resources (DNR) water drawn report - Water Produced vs. Water Sold = Water Loss
7384.D1.6	Describe the different types of public notification.
7384.D1.7	Examine new and emerging technologies in water systems.
7384.D1.8	Examine the responsibilities of water plant administration. - Construction Inspection - Emergency Response Training - Risk Assessment - Instrumentation (e.g., GIS, SCADA) - Asset Management
7384.D1.9	Demonstrate ability to read and interpret maps and drawings of the water system.
7384.D1.10	Develop a working knowledge of preventive maintenance, troubleshooting & repair of mechanical equipment.

Arts, Entertainment, & Design

Arts, AV Tech and Communication: Special Topics	
Career Cluster	Arts, Entertainment, & Design
Program of Study	
NLPS Sequence	
Course Code	4576
Course Description	*Arts, AV Tech and Communication: Special Topics is an extended learning experience designed to address the advancement and specialization of careers within the career cluster through the provision of a specialized course for a specific workforce need in the school's region. The learning experience is at a qualified site, and is designed to give the student the opportunity to learn and practice technical skills; while working under the direction of the appropriately licensed professional. Throughout the course, students will focus on learning about employment opportunities and obtaining the knowledge, skills and attitudes essential for success in specific occupations. Course standards and curriculum must be tailored to the specific profession, preparing students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. Participation in a related CTSO encourages the development of leadership, communication and career related skills, and opportunities for community service.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Industrial Arts 7-12, K12 ● Appropriate Vocational License
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Appropriate Vocational license ● Occupational Specialist in related course approved for a CTE pathway
Rules 2002	● Technology Education with high school setting ● Appropriate CTE License with high school setting

	● Workplace Specialist in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education 5-12 ● Appropriate CTE License 5-12 ● Workplace Specialist in related course
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	

Introduction to Communications	
Career Cluster	Arts, Entertainment, & Design
Program of Study	
NLPS Sequence	Introductory
Course Code	4790
Course Description	*Introduction to Communications is a course designed to provide a foundational knowledge of identifying and using modern communication to exchange messages and information. This course explores the application of the tools, materials, and techniques used to design, produce, use, and assess systems of communication. Students will produce graphic and electronic media as they apply communication technologies. This course will also explore the various technical processes used to link ideas and people through the use of electronic and graphic media. Major goals of this course include an overview of communication technology; the way it has evolved, how messages are designed and produced, and how people may profit from creating information services and products. Students will explore mass media communication processes including radio and television broadcasting, publishing and printing activities, telecommunication networks, recording services, computer and data processing networks, and other related systems. Students will use the design process to solve design projects in each*

	communication area.
Prerequisite(s)/ Corequisite(s)	None
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	Introductory
Bulletin 400	● Industrial Arts 7-12, K12 ● English 7-12 and work experience in communications/media\ ● Journalism 7-12
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway ● English 9-12 and work experience in communications/media ● Journalism 9-12
Rules 2002	● Technology Education with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway ● Language Arts with high school setting and work experience in communications/media ● Journalism with high school setting
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway ● Journalism 5-12 ● Language Arts 5-12 and work experience in communications/media
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***

4790.D1.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
4790.D1.2	Explain the benefits and responsibilities of being a member of a CTSO.
4790.D1.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
4790.D1.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
4790.D2.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
4790.D2.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster.
4790.D2.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
4790.D2.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society.
4790.D2.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest.
4790.D2.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
4790.D2.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster.
Domain	***Design Concepts of Communication Fundamentals***
4790.D3.1	Students integrate design concepts within project solutions.
4790.D3.2	Relate a communication model to any communication systems
4790.D3.3	Assess and understand the impacts of a communication product on individuals, society, and the environment
4790.D3.4	Design media following common rules for "good" visual layout
4790.D3.5	Describe the design principles and processes used to generate graphic media
4790.D3.6	Utilize design elements in projects
Domain	***Systems Model***
4790.D4.1	Students analyze the communication systems model and evaluate the need of a system or product.
4790.D4.2	Define and describe communication systems
4790.D4.3	Describe and define sending messages in the communication processes
4790.D4.4	Describe the major technological actions (developing, producing, using, and assessing) that people participate in as related to communication systems
4790.D4.5	Explain familiar electronic communication devices or networks using a systems model

4790.D4.6	Discuss the common techniques in transmission of messages
4790.D4.7	Describe the nature of messages and information signals
Domain	***Problem-Solving Approach***
4790.D5.1	Students select the problem-solving process to develop the solution to a given project.
4790.D5.2	List the steps in the problem-solving approach
4790.D5.3	Develop a statement that defines a problem or opportunity that could be addressed by a communication product
4790.D5.4	Develop and refine solutions to a communication problem or opportunity
4790.D5.5	Select and produce a communication product that meets a problem or opportunity
Domain	***Historical Impacts/Achievements of Communication Fundamentals***
4790.D6.1	Students analyze the historical impacts of the past, and how communication technology is utilized today.
4790.D6.2	List several stages in the development of the computer and explain their significance
4790.D6.3	Analyze the historical development of the computer and its peripheral components
4790.D6.4	List and describe the important events in the evolution of communications technologies
4790.D6.5	Describe the importance of design in the development of the evolution of communication media and systems
4790.D6.6	Define communication and communication technology here today and in the past
Domain	***Utilization of Technical Graphics***
4790.D7.1	Students create technical drawings using appropriate technology.
4790.D7.2	Describe technical graphics and their use in communications
4790.D7.3	Identify and describe the major types of technical drawing
4790.D7.4	Prepare pictorial drawings of simple objects
4790.D7.5	Sketch and draw Multiview drawings of simple objects
4790.D7.6	Describe and prepare simple oblique, isometric, perspective, and Multiview drawings
4790.D7.7	Use CAD or graphics software to prepare a simple drawing
Domain	***Producing Printed and Photographic Media***
4790.D8.1	Students create printed and photographic media using the design principles.
4790.D8.2	Briefly describe the various graphic, photographic, and printing processes
4790.D8.3	Generate, prepare, and print images for various printing processes
4790.D8.4	Develop sufficient proficiency to enter, manipulate, save, recall, and print a file using word processing, spread sheet, and technical graphic software
4790.D8.5	Given the target audience, the student will be able to show the importance of assessment in the advertising media industry
4790.D8.6	Explain the elements of visual design unique to the photographic system
4790.D8.7	Plan and present a photographic communication message
4790.D8.8	Describe and develop an assessment for photographic messages
4790.D8.9	Describe the steps of photographic systems

4790.D8.10	Describe the essential parts and functions of cameras and scanners
4790.D8.11	Utilize software for print correction, proofing, and output of digital media
Domain	***Developing and Using Electronic Media***
4790.D9.1	Students apply concepts of the design process utilizing various forms of electronic media applications.
4790.D9.2	Identify how electronic media is regulated at the local, federal, and international levels
4790.D9.3	Describe various classifications of electronic media
4790.D9.4	Describe the application of electronics in modern communication
4790.D9.5	Create a storyboard to produce a script for an electronic media production
4790.D9.6	List and explain the major steps in producing both print and electronic messages
4790.D9.7	Describe the action required to produce and communicate an electronic media message
4790.D9.8	Describe the types of products that are produced by the graphic and electronic communications industry
4790.D9.9	Explain how audible messages are converted into signals for transmission of information and data
4790.D9.10	Describe communications systems and relate a model of the communication process various graphic and electronic media
4790.D9.11	Record and store an electronic media message in different file formats (i.e., vector, rastor, bmp, & PDF)
4790.D9.12	Using desktop publishing software, prepare a layout for a newsletter or other publication
4790.D9.13	List and describe the steps used to prepare for a video production
ICOM.D8.13	Evaluate a given message and determine the materials and props needed for production
ICOM.D8.14	Discuss the criteria used for talent and script selection
ICOM.D8.15	Discuss the impacts of electronic communication systems on individuals, communities, and the environment
ICOM.D8.16	Describe the difference between audio media and other forms of communication technology
ICOM.D8.17	Describe the importance of proper direction in electronic communication production activities
ICOM.D8.18	Plan and produce a radio commercial or podcast
ICOM.D8.19	List and describe examples of audio devices, systems, and technologies
ICOM.D8.20	Record, edit, save, and publish audio files
ICOM.D8.21	Identify and describe various computer input and output devices
ICOM.D8.22	Explain the advantages and disadvantages of global information networks
ICOM.D8.23	Utilization of government, public, and educational websites
ICOM.D8.24	Identify the steps in establishing a website

Design Fundamentals	
Career Cluster	Arts, Entertainment, & Design
Program of Study	
NLPS Sequence	Introductory
Course Code	4834
Course Description	*Design Fundamentals introduces students to fundamental design theory. Investigations into design theory and color dynamics will provide experiences in applying design theory, ideas and creative problem solving in the area of communication technology. Student learning experiences encompass art history, art criticism, aesthetics, and production, which lead to the creation of portfolio-quality works. Students reflect upon and refine their work; explore cultural and historical connections; analyze, interpret, theorize, and make informed judgments about artwork and the nature of art in areas of communication; relate art to other disciplines and discover opportunities for integration; and incorporate literacy and presentational skills.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	Fulfills a Fine Arts requirement for the Core 40 Academic Honors Diploma
Dual Credit Status	X
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	Introductory	
Bulletin 400	● Industrial Arts 7-12, K12 ● Arts & Crafts 7-12, K-12 ● Any Home Economics K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Visual Arts 9-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist: Business IT: Interactive Media 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: FACS with high school setting ● Fine Arts: Visual Arts with high school setting ● Workplace Specialist: Interactive Media 9-12 ● Workplace Specialist: Radio and TV 9-12	
REPA/REPA 3	● Technology Education 5-12 ● CTE: FACS 5-12 ● Fine Arts: Visual Arts 5-12 ● Workplace Specialist: Interactive Media 9-12	

	● Workplace Specialist: Radio & TV 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Foundations of Design***
4834.D1.1	Students evaluate the historical foundation of design to gain background knowledge for designing communication products.
4834.D1.2	Review the historical foundations of design in art
4834.D1.3	Incorporate styles and mannerisms of past art and design into works
4834.D1.4	Identify and discuss important eras, designers, genres, and techniques in 20th and 21st century graphic design
4834.D1.5	Examine how historical artists can influence design and illustration.
4834.D1.6	Identify and describe emerging trends and technologies in the Graphic Design Fields
Domain	***Graphic Design***
4834.D2.1	Students generate solutions to visual design problems that combine art and technology to communicate ideas.
4834.D2.2	Identify the different areas of graphic design
4834.D2.3	Analyze different types of media for graphic arts
4834.D2.4	Identify and describe different printmaking processes
4834.D2.5	Describe the applications of graphic design
4834.D2.6	Demonstrate and discuss work developed as part of a design team
4834.D2.7	Discuss how symbols and logos represent ideas or identity
Domain	***Principles and Elements of Design***
4834.D3.1	Students utilized the Elements and Principles of Design in visual design solutions to enhance the communication of an idea.
4834.D3.2	Define basic terminology related to the elements and principles of design

4834.D3.3	Identify the utilization of the five elements of line, shapes, mass, texture, and color as they apply to basic design
4834.D3.4	Study composition principles
4834.D3.5	Recognize and employ color theory and color perception
Domain	***The Design Process & Concept Development***
4834.D4.1	Students demonstrate creative and visual problem solving using the design process for optimal design quality.
4834.D4.2	Plan the use of the elements principles of design to solve a visual art problem
4834.D4.3	Identify the customers wants and need for the design
4834.D4.4	Research ideas and company profile
4834.D4.5	Evaluate Target market
4834.D4.6	Draw and refine designs from thumbnails to final design
4834.D4.7	Prepare designs for presentation
4834.D4.8	Describe the job flow from initial customer contact to collection of payment
4834.D4.9	Produce drawings for communicating and presenting a concept visually
Domain	***Page Layout***
4834.D5.1	Students design products using basic page layout techniques to enhance overall visual appeal and communication.
4834.D5.2	Proportions and White space
4834.D5.3	Apply the rules of effective typography using hand and/or computer skills
4834.D5.4	Compare and contrast the use of images in projects (Illustration verses Photo)
4834.D5.5	Discern the differences between Text and Typography
4834.D5.6	Interpret appropriate Copyrights on text and images
4834.D5.7	Demonstrate how to place scanned graphics/photos into existing page layout
4834.D5.8	Demonstrate text alignment, element positioning, and rules of page design for printed matter
4834.D5.9	Examine and construct documents with multiple measurement systems used in the field
Domain	***Career Opportunities***
4834.D6.1	Students apply and adapt career resources to evaluate career opportunities in design.
4834.D6.2	Explore career opportunities in graphic design
4834.D6.3	Identify different artistic and professional disciplines in visual communications
4834.D6.4	Explore opportunities in a post-secondary educational program
4834.D6.5	Compare and contrast careers in graphics and design, along with their education, training requirements, and salary ranges
4834.D6.6	Identify gender and diversity related issues in graphics and/or design
Domain	***Portfolio and Presentation***
4834.D7.1	Students demonstrate the development of a professional portfolio for future career development.
4834.D7.2	List the criteria for selecting artwork

4834.D7.3	Collect and refine all previous graphic design projects-- Select and organize content
4834.D7.4	Giving and receiving constructive criticism of portfolios
4834.D7.5	List common types of portfolios and their uses

Introduction to Housing and Interior Design		
Career Cluster	Arts, Entertainment, & Design	
Program of Study		
NLPS Sequence	Introductory	
Course Code	5350	
Course Description	*Introduction to Housing and Interior Design is an introductory course essential for those students interested in academic enrichment or a career within the housing, interior design, or furnishings industry. This course addresses the selection and planning of designed spaces to meet the needs, wants, values and lifestyles of individuals, families, clients, and communities. Housing decisions, resources and options will be explored including factors affecting housing choices and the types of housing available. Developmental influences on housing and interior environments will also be considered. Basic historical architectural styling and basic furniture styles will be explored as well as basic identification of the elements and principles of design. Design and space planning involve evaluating floor plans and reading construction documents while learning to create safe, functional, and aesthetic spaces. Presentation techniques will be practiced to thoroughly communicate design ideas. Visual arts concepts including aesthetics, criticism, history and production, are addressed. Direct, concrete mathematics proficiencies will be applied. A project-based approach will be utilized requiring higher order thinking, communication, leadership and management processes as housing and interior design content is integrated into the design of interior spaces while meeting specific project criteria. This course provides the foundation for further study and careers in the architecture, construction, housing, interior design, and furnishings industries.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a Fine Arts requirement for the Core 40 Academic Honors Diploma	
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Introductory	
Bulletin 400	● Industrial Arts 7-12, K12 ● Arts & Crafts 7-12, K-12 ● Any Home Economics K-12	
Rules 46-47	● Industrial Technology K-12	

	● Industrial Education K-12 ● Visual Arts 9-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist: Business IT: Interactive Media 9-12
Rules 2002	● Technology Education with high school setting ● CTE: FACS with high school setting ● Fine Arts: Visual Arts with high school setting ● Workplace Specialist: Interactive Media 9-12 ● Workplace Specialist: Radio and TV 9-12
REPA/REPA 3	● Technology Education 5-12 ● CTE: FACS 5-12 ● Fine Arts: Visual Arts 5-12 ● Workplace Specialist: Interactive Media 9-12 ● Workplace Specialist: Radio & TV 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
5350.D8.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
5350.D8.2	Explain the benefits and responsibilities of being a member of a CTSO.
5350.D8.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5350.D8.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
5350.D9.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.

5350.D9.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster.
5350.D9.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
5350.D9.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society.
5350.D9.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest.
5350.D9.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
5350.D9.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster.
Domain	***Housing Decisions, Resources, and Options***
5350.D3.1	Evaluate housing decisions in relation to available resources and options.
5350.D3.2	Examine factors affecting housing choices and types of available housing related to satisfying needs, wants, values and lifestyles of individuals, families, clients, and communities
5350.D3.3	Assess individual, family, client and community needs, goals, and resources in planning for housing, interiors, and furnishings
5350.D3.4	Analyze geographic locations, safety and security, energy-efficiency, aesthetic preferences, and required maintenance to make housing choices that meet the needs of individuals, families, clients, and communities
5350.D3.5	Evaluate the impact of zoning regulations, restrictions, and ownership options on housing choices
5350.D3.6	Examine processes and costs for acquiring and maintaining a residence or business
Domain	***Space Planning of Housing and Interior Environments***
5350.D4.1	Develop space planning skills used in housing, interior design, and furnishings careers.
5350.D4.2	Interpret and evaluate floor plans and scaled drawings
5350.D4.3	Analyze activity zones, traffic patterns, and storage systems of floor plans for safety, efficiency, and adequacy
5350.D4.4	Create floor/space plans that meet the needs of individuals, families, and clients
5350.D4.5	Apply universal and accessibility guidelines and regulations to floor/space planning and furniture arrangement of living/sleeping, service/work, and kitchen/bath areas
5350.D4.6	Prepare interior floor/space plans using standard industry scales and symbols
5350.D4.7	Describe industry standards for measuring, estimating, purchasing, and pricing
5350.D4.8	Examine aesthetics, function, and psychological impacts of design plans that address individual, family, client, and/or community needs, goals, and resources
Domain	***Communications and Marketing***
5350.D5.1	Integrate processes of communication in the creation, expression, and interpretation of design information and ideas.
5350.D5.2	Devise and write a design plan identifying design phases and processes, client needs and

	consultations, and project management skills
5350.D5.3	Demonstrate professional lettering and labeling, creation of legends, keys, and information boxes, etc. to communicate design ideas
5350.D5.4	Design and illustrate the foundational elements of marketing a professional identity
5350.D5.5	Practice various methods of interior design presentation using available information technology, presentation media, and other resources in client presentations and additional communication processes
5350.D5.6	Create presentation boards utilizing professional mounting techniques and arrangement of items to communicate to a client all aspects of design plans/ideas
Domain	***Design Concepts of Housing, Interiors, and Furnishings***
5350.D6.1	Practice and analyze technical design and space planning skills related to the function of housing, interior spaces, and furnishings***.***
5350.D6.2	Identify and apply architectural symbols in the design of housing and interior spaces
5350.D6.3	Interpret and evaluate a variety of construction drawings and documents
5350.D6.4	Identify the elements and principles of design
5350.D6.5	Analyze floor plans for arrangement of furniture and furnishings considering architectural features, usable space, circulation/traffic patterns, clearance spaces, and the elements and principles of design
5350.D6.6	Draw interior space plans and design living, sleeping, service, and/or work areas to scale using architectural symbols
5350.D6.7	Demonstrate mathematical applications in the creation of scaled plans, measuring and calculation of square footage, volume of interior space, and cost per square foot
5350.D6.8	Select and arrange suitable furnishings and accessories for a given space using industry scaled templates
5350.D6.9	Apply color theory, design elements and design principles in planning and selection of furnishings and appropriate interior background treatments for floors, walls, and windows of living and work environments
5350.D6.10	Compare and contrast functionality and aesthetics of interior space designs, furniture arrangement, and common architectural features
Domain	***Developmental Influences on Housing and Interior Environments***
5350.D7.1	Assess factors that influence design and development in housing and interiors.
5350.D7.2	Identify ways that historical and contemporary societal aspects, as well as emerging trends, affect the design of housing and interior environments and the space needs of individuals, families, clients, and communities
5350.D7.3	Identify design concepts of interior environments to accommodate universal design, accessibility, and other needs of the physically challenged and elderly
5350.D7.4	Identify features of basic architecture and furniture styles
5350.D7.5	Describe how features of architecture, furniture, and furnishings have been influenced by technology and mass production through various historical periods
5350.D7.6	Identify environmental factors and emerging trends related to master planning of

	communities and the design of sustainable and “green” housing and furnishings

Introduction to Fashion & Textiles	
Career Cluster	Arts, Entertainment, & Design
Program of Study	
NLPS Sequence	
Course Code	5380
Course Description	*Introduction to Fashion and Textiles is an introductory course for those students interested in academic enrichment or a career in the fashion, textile, and apparel industry. This course addresses knowledge and skills related to design, production, acquisition, and distribution in the fashion, textile, and apparel arena. The course includes the study of personal, academic, and career success; careers in the fashion, textile, and apparel industry; factors influencing the merchandising and selection of fashion, textile, and apparel goods and their properties, design, and production; and consumer skills. A project-based approach integrates instruction and laboratory experiences including application of the elements and principles of design, aesthetics, criticism, history and production; selection, production, alteration, repair, and maintenance of apparel and textile products; product research, development, and testing; and application of technical tools and equipment utilized in the industry. Direct, concrete mathematics proficiencies will be applied. Service learning and other authentic applications are strongly recommended. This course provides the foundation for continuing and post-secondary education in fashion, textile, and apparel-related careers.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	Fulfills a Fine Arts requirement for the Core 40 Academic Honors Diploma
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	Introductory
Bulletin 400	● Any Home Economics K-12
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
5380.D1.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
5380.D1.2	Explain the benefits and responsibilities of being a member of a CTSO.
5380.D1.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5380.D1.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
5380.D2.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
5380.D2.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster.
5380.D2.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
5380.D2.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society.
5380.D2.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest.
5380.D2.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
5380.D2.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster.
Domain	***Properties of Fashion, Textiles, and Apparel Products***
5380.D3.1	Evaluate properties of fashion, textile, and apparel products to determine performance and

	functionality in a variety of end uses.
5380.D3.2	Identify and categorize common textile fibers
5380.D3.3	Explain properties and performance characteristics of fibers, yarns, woven fabrics, knit fabrics, and non-woven textile products
5380.D3.4	Analyze effects of textile characteristics on design, construction, care, use, and maintenance of fashion and apparel products
5380.D3.5	Apply appropriate procedures for care of fashion, textile, and apparel products
Domain	***Design Skills***
5380.D4.1	Describe relationships and applications of elements and principles of design in fashion, apparel, and textile design.
5380.D4.2	Identify the elements and principles of design in designing, constructing, and/or altering fashion, textile, and apparel products
5380.D4.3	Explain ways in which fibers, fabrics, textures, patterns, and finishes can affect visual appearance
5380.D4.4	Apply basic color theory to develop and enhance visual effects of fashion, textile, and apparel products
5380.D4.5	Explore designs and clothing styles considering individual, family, and community needs, and fashion, textile, and apparel trends
5380.D4.6	Describe social, religious, historical, political, economic, and technological influences on fashion, textile, and apparel design
Domain	***Fashion, Textile, and Apparel Production***
5380.D5.1	Demonstrate skills necessary for the production, alteration, and repair of fashion, textile, and apparel products.
5380.D5.2	Use appropriate industry products and materials for cleaning, pressing, and finishing fashion, textile, and apparel products
5380.D5.3	Demonstrate basic skills of pattern selection, alteration, and layout of fashion, textile, and apparel products
5380.D5.4	Demonstrate basic techniques for constructing, altering, and repairing fashion, textile, and apparel products
5380.D5.5	Select appropriate tools and equipment for specific applications in fashion, textile, and apparel construction, alteration, or repair
5380.D5.6	Demonstrate technical skills required of industry professionals in the use, inventory, and maintenance of equipment, tools, and supplies for fashion, textile, and apparel construction, alteration, or repair
5380.D5.7	Explore current trends and demonstrate use of available technology for fashion, textile, and apparel design and production
5380.D5.8	Demonstrate mathematical applications in constructing, altering, and repairing fashion, textile, and apparel products
Domain	***Consumer Skills and Fashion Merchandising***
5380.D6.1	Analyze factors that affect merchandising and selection of fashion, textile, and apparel

	products in the local and global community.
5380.D6.2	Use consumer skills to evaluate the quality of fashion, textile, and apparel products
5380.D6.3	Analyze factors that influence selection of fashion, textile, and apparel products
5380.D6.4	Compare and contrast criteria for maintaining standards of personal appearance and selecting attire appropriate for specific settings
5380.D6.5	Analyze costs of constructing, manufacturing, altering, or repairing fashion, textile, and apparel products
5380.D6.6	Explore textile legislation, standards, and labeling in the global economy
5380.D6.7	Analyze consumer and industry responsibilities regarding safety, security, ethical, and environmental factors in the textile and apparel industry
5380.D6.8	Explain the purposes of government rules and regulations in fashion, textile and apparel construction, alteration, or repair (e.g., Occupational Safety and Health Administration [OSHA], Consumer Product Safety Commission [CPSC])
5380.D6.9	Describe the impact of various factors, including societal trends, aesthetics, and availability of resources, on the fashion, textile, and apparel industry
5380.D6.10	Investigate the physical, psychological, and social functions of clothing influencing fashion, textile, and apparel merchandising
5380.D6.11	Apply merchandising and marketing strategies for fashion, textile, and apparel products
5380.D6.12	Practice various methods of fashion, textile, and apparel presentation using available information technology, presentation media, and other resources

Advanced Career & Technical Education, College Credit: Arts, Entertainment, and Design	
Career Cluster	Arts, Entertainment, & Design
Program of Study	
NLPS Sequence	
Course Code	6134
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited postsecondary institution through an adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint program of study involving a postsecondary partnership.*
Prerequisite(s)/ Corequisite(s)	None Recommended Prerequisites: CTE courses that would help prepare the student for success in this area.
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	

Dual Credit Status	X (PCL/CTE)
Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Industrial Arts 7-12, K12 ● Appropriate Vocational License
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Appropriate Vocational license ● Occupational Specialist in related course approved for a CTE pathway
Rules 2002	● Technology Education with high school setting ● Appropriate CTE License with high school setting ● Workplace Specialist in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education 5-12 ● Appropriate CTE License 5-12 ● Workplace Specialist in related cou
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Arts, Entertainment, & Design Digital Design							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7140	Principles of Digital Design	7141	Digital Design Graphics	7136	Professional Photography and Videography	7246	Digital Design Capstone
				5550	Graphic Design and Layout		
				7138	Interactive Media Design		

Principles of Digital Design		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Digital Design	
NLPS Sequence	A	
Course Code	7140	
Course Description	*Principles of Digital Design introduces students to fundamental design theory. Investigations into design theory and color dynamics will provide experiences in applying design theory, ideas and creative problem solving, critical peer evaluation, and presentation skills. Students will have the opportunity to apply the design theory through an understanding of basic photographic theory and technique. Topics will include image capture, processing, various output methods, and light.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Business Education with Vocational Business Endorsement 7-12	
Rules 46-47	● Business Education with Vocational Business Endorsement 9-12 ● Occupational Specialist: Business IT: Interactive Media 9-12	
Rules 2002	● CTE: Business Services & Technology with high school setting	

	● Workplace Specialist: Business IT: Interactive Media ● CTE: Trade & Industrial: 3D Computer Animation & Visualization ● Business with high school setting ● Workplace Specialist: 3D Computer Animation & Visualization ● Workplace Specialist: Interactive Media ● Workplace Specialist: Graphic Imaging Technology ● CTE: Trade & Industrial Photography 5-12 ● Workplace Specialist: Commercial Photography 9-12
REPA/REPA 3	● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Trade & Industrial: 3D Computer Animation & Visualization 5-12 ● CTE: Trade & Industrial Graphic Arts 5-12 ● CTE: Trade & Industrial: Graphic Imaging Technology 5-12 ● Workplace Specialist: Interactive Media 9-12 ● Business 5-12 ● Workplaec Specialist: Graphic Imaging Technology 9-12 ● Workplace Specialist: Graphic Design & Layout 9-12 ● Workplace Specialist: 3D Computer Animation & Visualization 9-12 ● CTE: Trade & Industrial Photography 5-12 ● Workplace Specialist: Commercial Photography 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	VISC 101: Design Fundamentals, PHOT 104: Photography I
VU Course Alignment	ARTT 111: Visual Design
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Visual Communications (50.0401) VU – A.S. Graphic Design (50.0499)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success Elective, ARTH 101: Survey of Art and Culture I, ARTH 102: Survey of Art and Culture II, or ARTH 105: History of Design
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Design Fundamentals***
7140.D1.1	Define and apply design process theory.
7140.D1.2	Create compositions, artwork, illustrations, layouts, designs, etc. that demonstrate the effective use of the elements and principles of design.
7140.D1.3	Demonstrate creative and visual problem-solving skills through exercises and/or projects utilizing vector/raster-based graphics programs and/or other traditional processes.
7140.D1.4	Generate ideas, notes and thumbnails manually or digitally.

7140.D1.5	Create oral or written justification using appropriate design vocabulary.
7140.D1.6	Engage in critical peer evaluation.
Domain	***Photography***
7140.D2.1	Demonstrate an ability to operate a camera using manual controls.
7140.D2.2	Measure incidental and reflective light for a subject and determine the proper camera settings.
7140.D2.3	Demonstrate printing equipment to produce properly exposed and processed prints.
7140.D2.4	Learn and employ methods of image correction.
7140.D2.5	Produce photographs which demonstrate an ability to control focus in a variety of situations.
7140.D2.6	Demonstrate an understanding of depth of field.
7140.D2.7	Demonstrate an understanding of capturing and freezing motion.
7140.D2.8	Understand how to apply the theory of equivalent exposures and bracketing.
7140.D2.9	Demonstrate the effects of time of day on the qualities and direction of available light.
7140.D2.10	Demonstrate an understanding of photographic filters and how they work.
7140.D2.11	Demonstrate an understanding of photographic composition and design.
7140.D2.12	Produce photographs that exhibit conceptual thinking ability.
Domain	***Career Navigation***
7140.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7140.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7140.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7140.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7140.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7140.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7140.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7140.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7140.D5.1	Demonstrate computer literacy skills and basic computer functions.
7140.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7140.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7140.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Digital Design Graphics		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Digital Design	
NLPS Sequence	B	
Course Code	7141	
Course Description	*Digital Design Graphics will help students to understand and create the most common types of computer graphics used in visual communications. Skills are developed through work with professional vector-based and page layout software used in the industry. Additionally, students will be introduced to a full range of image input technology and manipulation including conventional photography, digital imaging, and computer scanners. Students will learn to communicate concepts and ideas through various imaging devices.*	
Prerequisite(s)/ Corequisite(s)	Principles of Digital Design	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Business Education with Vocational Business Endorsement 7-12	
Rules 46-47	● Business Education with Vocational Business Endorsement 9-12 ● Occupational Specialist: Business IT: Interactive Media 9-12	
Rules 2002	● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Interactive Media ● CTE: Trade & Industrial: 3D Computer Animation & Visualization ● Business with high school setting ● Workplace Specialist: 3D Computer Animation & Visualization ● Workplace Specialist: Interactive Media ● Workplace Specialist: Graphic Imaging Technology ● CTE: Trade & Industrial Photography 5-12 ● Workplace Specialist: Commercial Photography 9-12	
REPA/REPA 3	● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Trade & Industrial: 3D Computer Animation & Visualization 5-12 ● CTE: Trade & Industrial Graphic Arts 5-12 ● CTE: Trade & Industrial: Graphic Imaging Technology 5-12 ● Workplace Specialist: Interactive Media 9-12 ● Business 5-12 ● Workplace Specialist: Graphic Imaging Technology 9-12	

	● Workplace Specialist: Graphic Design & Layout 9-12 ● Workplace Specialist: 3D Computer Animation & Visualization 9-12 ● CTE: Trade & Industrial Photography 5-12 ● Workplace Specialist: Commercial Photography 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	VISC 102: Raster Graphics; VISC 115: Vector Graphics and Publication Design I
VU Course Alignment	DESN 120: Computer Illustration, DESN 140: Computer Imaging
Four Yr. Course Alignment	BSU - GCM 184: Graphics: Computer Applications PFW - AD 10502: Digital Imaging PNW - AD 32800: Visual Communication Design I
Postsecondary Credential	ITCC - TC Visual Communications (50.0401) VU - A.S. Graphic Design (50.0499) PFW – B.A. Fine Arts (50.0701) BSU - B.A./B.S. Graphic Arts Management (50.0402) PNW - BA in Communication: Visual Communication Design (9.0101)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success Elective, ARTH 101: Survey of Art and Culture I, ARTH 102: Survey of Art and Culture II, or ARTH 105: History of Design
Promoted Certifications	Adobe Illustrator
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Vector Graphics and Publication Design***
7141.D1.1	Navigate within the computer's operating environment.
7141.D1.2	Demonstrate a working knowledge of the hardware components and peripherals.
7141.D1.3	Execute fundamental type formatting and editing.
7141.D1.4	Develop the critical basics of effective page layout software operation.
7141.D1.5	Utilize illustration tools to manipulate paths and anchor points.
7141.D1.6	Recognize graphic file formats and appropriate uses.
Domain	***Raster Graphics***
7141.D2.1	Operate image input devices.
7141.D2.2	Explain the physical properties of light and the basic laws of photographic optics (how light behaves).
7141.D2.3	Explain the differences between various graphic file formats, image resolution, and proper light levels.
7141.D2.4	Create images that use the principles/fundamentals of design.
7141.D2.5	Demonstrate the ability to solve communication design problems using imaging.
7141.D2.6	Develop hand/computer-imaging skills.

7141.D2.7	Apply the rules of effective typography using hand and/or computer skills.
7141.D2.8	Demonstrate a variety of imaging methods in application to class projects.
7141.D2.9	Be able to assess your work and others constructively and effectively.

Graphic Design and Layout		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Digital Design	
NLPS Sequence	C	
Course Code	5550	
Course Description	*Graphic Design and Layout teaches design process and the proper and creative use of type as a means to develop effective communications for global, corporate and social application. Students will create samples for a portfolio, which may include elements or comprehensive projects in logo, stationery, posters, newspaper, magazine, billboard, and interface design.*	
Prerequisite(s)/ Corequisite(s)	Principles of Digital Design; Digital Design Graphics	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Business Education with Vocational Business Endorsement 7-12 ● Standard Trade & Industrial: Commercial Art K-12 ● Standard Trade & Industrial: Graphic Arts ● Printing K-12	
Rules 46-47	● Business Education with Vocational Business Endorsement 9-12 ● Occupational Specialist: Business IT: Interactive Media 9-12 ● Standard Trade & Industrial: Commercial Art 9-12 ● Occupational Specialist I, II or III: Commercial Art 9-12 ● Standard Trade & Industrial: Graphic Arts 9-12 ● Occupational Specialist I, II or III: Graphic Arts 9-12 ● Trade & Industrial: Printing 9-12 ● Occupational Specialist I, II or III: Printing 9-12	
Rules 2002	● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Interactive Media ● CTE: Trade & Industrial: Commercial Art & Graphic Design ● Workplace Specialist: Commercial Art & Graphic Design ● CTE: Trade & Industrial: Graphic Imaging Technology	

	● Workplace Specialist: Graphic Imaging Technology ● Workplace Specialist: Interactive Media
REPA/REPA 3	● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Trade & Industrial Graphic Arts 5-12 ● CTE: Trade & Industrial: Graphic Imaging Technology 5-12 ● Workplace Specialist: Graphic Design & Layout 9-12 ● Workplace Specialist: Graphic Imaging Technology 9-12 ● Workplace Specialist: Interactive Media 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	VISC 113: Typography, VISC 114: Graphic Design I
VU Course Alignment	DESN 155: Computer Page Layout
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Visual Communications (50.0401) VU - A.S. Graphic Design (50.0499)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 1XX Student Success Elective, ARTH 101: Survey of Art and Culture I, ARTH 102: Survey of Art and Culture II, or ARTH 105: History of Design
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Typography***
5550.D1.1	Describe, appreciate, and apply the history and development of type and typefaces.
5550.D1.2	Describe and use typographic terminology.
5550.D1.3	Create various design projects/layouts that demonstrate the ability to solve communication design problems using typography.
5550.D1.4	Be aware of the design (typefaces, hand lettering, font creation) options available, and fully utilize the unique potential of the typography.
5550.D1.5	Develop an attention to detail to recognize typographic rules and aesthetics.
5550.D1.6	Evaluate your and peer work critically.
Domain	***Graphic Design and Layout***
5550.D2.1	Create portfolio quality projects by applying the design process.
5550.D2.2	Develop marketing concepts by completing creative briefs based on global, corporate, and social applications and target audience.
5550.D2.3	Visualize ideas by means of research, thumbnail sketches, and developmental drafts.
5550.D2.4	Identify print reproduction criteria necessary for various media.

5550.D2.5	Adhere to a production schedule to meet deadlines in an efficient and professional manner.
5550.D2.6	Present and provide feedback to peers, clients, faculty, or advisors.

Interactive Media Design		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Digital Design	
NLPS Sequence	C	
Course Code	7138	
Course Description	*Interactive Media Design focuses on the tools, strategies, and techniques for interactive design and emerging technologies, like web and social media. Students will learn the basics of planning, shooting, editing and post-producing video and sound. Additionally, students will explore the process of integrating text, graphics, audio and video for effective communication of information.*	
Prerequisite(s)/ Corequisite(s)	Principles of Digital Design; Digital Design Graphics	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Business Education with Vocational Business Endorsement 7-12	
Rules 46-47	● Business Education with Vocational Business Endorsement 9-12 ● Occupational Specialist: Business IT: Interactive Media 9-12	
Rules 2002	● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Interactive Media ● CTE: Trade & Industrial: 3D Computer Animation & Visualization ● Business with high school setting ● Workplace Specialist: 3D Computer Animation & Visualization ● Workplace Specialist: Interactive Media ● Workplace Specialist: Graphic Imaging Technology	
REPA/REPA 3	● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Trade & Industrial: 3D Computer Animation & Visualization 5-12 ● CTE: Trade & Industrial Graphic Arts 5-12 ● CTE: Trade & Industrial: Graphic Imaging Technology 5-12 ● Workplace Specialist: Interactive Media 9-12	

	● Business 5-12 ● Workplace Specialist: Graphic Imaging Technology 9-12 ● Workplace Specialist: Graphic Design & Layout 9-12 ● Workplace Specialist: 3D Computer Animation & Visualization 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	VISC 110: Web & Social Media, VISC 105: Video and Sound
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Visual Communications (50.0401)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 1XX Student Success Elective, ARTH 101: Survey of Art and Culture I, ARTH 102: Survey of Art and Culture II, or ARTH 105: History of Design
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Web and Social Media***
7138.D1.1	Discuss the current online/interactive environment and the unique design challenges this media (websites, mobile, and social media) presents.
7138.D1.2	Identify and apply effective design solutions based on content.
7138.D1.3	Understand how User Experience (UX) impacts online/interactive media.
7138.D1.4	Discuss the importance of proper research, brainstorming and thumbnails.
7138.D1.5	Analyze and optimize graphic files for web delivery.
7138.D1.6	Evaluate the aesthetics of interactive media such as websites, social media, mobile design.
7138.D1.7	Recognize the importance and power of social media in maintaining content.
7138.D1.8	Identify current and emerging social media trends.
7138.D1.9	Understand Search Engine Optimization (SEO) theory and current practices.
7138.D1.10	Apply professional quality standards in the role of blogging, social networking, dynamic media, and the mobile web to build the brand of a company, person, or organization
7138.D1.11	Implement interactive media such as websites, social media mobile design using current editing software.
7138.D1.12	Manipulate and optimize images for web utilization with industry-standard graphic software.
7138.D1.13	Understand web hosting options.
Domain	***Video and Sound***
7138.D2.1	List and compare various formats for video recording, storage, and sequencing.
7138.D2.2	Describe the production process and define the responsibilities of production team members.

7138.D2.3	Learn the basics of planning, shooting, editing and post-producing video.
7138.D2.4	Analyze videos for technical quality and aesthetic principles.
7138.D2.5	Demonstrate competent usage and handling of video equipment.
7138.D2.6	Incorporate effective visual aesthetics in capturing video content.
7138.D2.7	Compile and edit video content into creative and technically successful projects.

Professional Photography & Videography		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Digital Design	
NLPS Sequence	C	
Course Code	7136	
Course Description	*Professional Photography & Videography further develops advanced camera skills and photographic vision. The course introduces special techniques and digital processes while refining printing and processing skills. It will also emphasize good composition and the use of photography as a communication tool. Students will also learn the basics of planning, shooting, editing and post-producing video and sound.*	
Prerequisite(s)/ Corequisite(s)	Principles of Digital Design; Digital Design Graphics	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Commercial Photography K-12	
Rules 46-47	● Standard Trade & Industrial: Commercial Photography 9-12 ● Occupational Specialist I, II or III: Commercial Photography 9-12	
Rules 2002	● CTE: Trade & Industrial: Commercial Photography ● Workplace Specialist: Commercial Photography	
REPA/REPA 3	● CTE: Trade & Industrial Photography 5-12 ● Workplace Specialist: Commercial Photography 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	PHOT 107: Photography II, VISC 105: Video and Sound	
VU Course Alignment		

Four Yr. Course Alignment	BSU - GCM 286: Graphics: Fundamentals of Photography
Postsecondary Credential	ITCC - TC Visual Communications (50.0401) BSU - B.A./B.S. Graphic Arts Management (50.0401)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 1XX Student Success Elective, ARTH 101: Survey of Art and Culture I, ARTH 102: Survey of Art and Culture II, or ARTH 105: History of Design
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Commercial Photography***
7136.D1.1	Apply zone system to black and white photography.
7136.D1.2	Effectively execute assignments starting with pre-visualization and ending with a properly exposed negative and print.
7136.D1.3	Demonstrate ability to use filters with the camera.
7136.D1.4	Demonstrate the ability to make decisions about depth of field and shutter speeds.
7136.D1.5	Demonstrate and refine ability to compose effectively.
7136.D1.6	Demonstrate advanced tonal controls, image adjustments, as well as various digital workflow processes to produce high quality digital prints.
7136.D1.7	Demonstrate the critical and aesthetic skills necessary to effectively assess photographic images.
7136.D1.8	Present orally a project to your peers, clients, faculty, or advisors.
Domain	***Video and Sound***
7136.D2.1	List and compare various formats for video recording, storage, and sequencing.
7136.D2.2	Describe the production process and define the responsibilities of production team members.
7136.D2.3	Learn the basics of planning, shooting, editing and post-producing video.
7136.D2.4	Analyze videos for technical quality and aesthetic principles.
7136.D2.5	Demonstrate competent usage and handling of video equipment.
7136.D2.6	Incorporate effective visual aesthetics in capturing video content.
7136.D2.7	Compile and edit video content into creative and technically successful project

Digital Design Capstone	
Career Cluster	Arts, Entertainment, & Design
Program of Study	Digital Design
NLPS Sequence	D
Course Code	7246

Course Description	*The Digital Design Capstone course provides students the opportunity to dive deeper into advanced concepts of Visual Communication including user experience/user interface design, video production editing, animation and/or web design. Depending on the length of the course, students may focus their efforts on one area or explore multiple aspects.*	
Prerequisite(s)/ Corequisite(s)	Digital Design Concentrator Sequence	
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Business Education with Vocational Business Endorsement 7-12	
Rules 46-47	● Business Education with Vocational Business Endorsement 9-12 ● Occupational Specialist: Business IT: Interactive Media 9-12	
Rules 2002	● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Interactive Media ● CTE: Trade & Industrial: 3D Computer Animation & Visualization ● Business with high school setting ● Workplace Specialist: 3D Computer Animation & Visualization ● Workplace Specialist: Interactive Media ● Workplace Specialist: Graphic Imaging Technology ● CTE: Trade & Industrial Photography 5-12 ● Workplace Specialist: Commercial Photography 9-12	
REPA/REPA 3	● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Trade & Industrial: 3D Computer Animation & Visualization 5-12 ● CTE: Trade & Industrial Graphic Arts 5-12 ● CTE: Trade & Industrial: Graphic Imaging Technology 5-12 ● Workplace Specialist: Interactive Media 9-12 ● Business 5-12 ● Workplace Specialist: Graphic Imaging Technology 9-12 ● Workplace Specialist: Graphic Design & Layout 9-12 ● Workplace Specialist: 3D Computer Animation & Visualization 9-12 ● CTE: Trade & Industrial Photography 5-12 ● Workplace Specialist: Commercial Photography 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	VIDT 210: Production Editing I, VISC 104: Experience/Interface (UX/UI) I*, VISC 200: Motion Graphics*, VISC 209: 3D Animation I*, VISC 210: Web Design I*	
VU Course		

Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Visual Communications (50.0401)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 1XX Student Success Elective, ARTH 101: Survey of Art and Culture I, ARTH 102: Survey of Art and Culture II, or ARTH 105: History of Design
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***User Experience/User Interface***
7246.D1.1	Describe, appreciate, and apply the history, development, and standards of experience/interface design.
7246.D1.2	Describe and use UX/UI terminology.
7246.D1.3	Demonstrate knowledge of the standards, terms, and applications of UX/UI.
7246.D1.4	Demonstrate an understanding of the various methods used in this field.
7246.D1.5	Through various assignments communicate your research, analysis, scenarios, etc. which show comprehension of the end users' needs.
7246.D1.6	Develop an awareness of all the interrelated factors that impact user experience (ADA compliance, mobile, user centered design, societal factors, etc.).
7246.D1.7	Demonstrate sound user experience design practice relative to the enhancement of communication and visual appeal.
7246.D1.8	Evaluate your peer and professional work critically.
Domain	***Production Editing I***
7246.D2.1	Ingest digital footage into an editing system.
7246.D2.2	Explore various aspects for the editing process.
7246.D2.3	Understand and use appropriate editing styles.
7246.D2.4	Create and refine a rough cut.
7246.D2.5	Produce projects using a non-linear editing system.
7246.D2.6	Integrate audio and video within a project.
7246.D2.7	Synchronize multiple concurrent video angles taken from a multi-camera shoot.
7246.D2.8	Experiment with special effects, masking, and matting.
7246.D2.9	Produce projects of varying lengths and output mediums.
7246.D2.10	Edit projects down to a specific time frame.
7246.D2.11	Present orally a project to your peers, clients, faculty, or advisors
Domain	***Motion Graphics***
7246.D3.1	Develop advanced creative interfaces for use in multimedia projects.

7246.D3.2	Integrate the principles of good multimedia design with a strong focus on the aesthetic component including research, brainstorming, and storyboarding.
7246.D3.3	Synchronize animation and sound.
7246.D3.4	Incorporate various mediums, including sound, images, audio, etc.
7246.D3.5	Describe the different roles of a multimedia producer within the industry.
7246.D3.6	Analyze the use of multimedia as a marketing tool.
7246.D3.7	Appraise and integrate different content and software to achieve one product.
7246.D3.8	Use basic programming skills to add functionality to a project.
7246.D3.9	Implement usability and functionality testing processes.
Domain	***3D Rendering and Animation***
7246.D4.1	Apply the ability to employ available 3D rendering and animation software packages.
7246.D4.2	Construct and render 3D models and textures for use in static and dynamic simulated environments.
7246.D4.3	Utilize constructed environments and models in various animations techniques.
7246.D4.4	Explain the history of computer animation.
7246.D4.5	Evaluate the possibilities of computer animation and how it is utilized in a variety of industries today.
Domain	***Web Design***
7246.D5.1	Explain Information Architecture (IA) how interactive media design affects user experience (UX), and how that translates to a successful user interface (UI).
7246.D5.2	Describe and apply effective interactive media design processes—including research, web project definition, organization, structure, process, and interaction.
7246.D5.3	Identify and apply effective design solutions based on content.
7246.D5.4	Discuss the importance of proper research, brainstorming and thumbnails, and wireframing.
7246.D5.5	Evaluate the aesthetics of interactive design pertaining to emerging trends.
7246.D5.6	Discuss the history of interactive design and the relationship they have with interactive design today
7246.D5.7	Discuss design principles (color, layout, typography) as they apply to interactive design.
7246.D5.8	Construct web pages using standards- compliant HTML5 and CSS3 that successfully passes validation tests of theW3C.
7246.D5.9	Discuss the use of helper technologies such as CSS frameworks, and when and why to use them.
7246.D5.10	Implement a simple JavaScript plugin to add dynamics to a website. W311. Create a final static website meeting the needs of a client.

Arts, Entertainment, & Design Fashion & Textile							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7301	Principles of Fashion Textile	7302	Textiles, Apparel, and Merchandising	7303	Advanced Textiles	7304	Fashion Textiles Capstone

Principles of Fashion and Textiles		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Fashion & Textile	
NLPS Sequence	A	
Course Code	7301	
Course Description	*Principles of Fashion and Textiles prepares students for occupations and higher education programs of study related to the entire spectrum of careers in the fashion industry. This course builds a foundation that prepares students for all aspects of the fashion creation process. Major topics include: Basic clothing construction techniques, pattern alterations, and use of commercial patterns.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Any Home Economics K-12	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	BSU - FASH 102: Fashion Studio I
Postsecondary Credential	BSU - B.A./B.S. in Fashion Industry Studies (52.1902)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Fundamentals of Apparel***
7301.D1.1	Identify, apply, and demonstrate skills for operating domestic sewing machines and overlock machines for beginning fashion design production.
7301.D1.2	Develop and demonstrate basic sewing techniques using commercial pattern standards and constructing garments from commercial patterns.
7301.D1.3	Evaluate and select appropriate sewing tools, pressing tools, and notions for fashion industry production.
7301.D1.4	Apply knowledge of appropriate woven fabric selection to construct beginning fashion products.
7301.D1.5	Gain knowledge of body and pattern measurements and the use of them in the selection process for garment fit and construction.
7301.D1.6	Demonstrate the ability to master and apply basic sewing skills and production principles.
Domain	***Dimensions of Clothing***
7301.D2.1	Students analyze dress and adornment emphasizing dimensions that affect the design and end uses of textiles and clothing.
7301.D2.2	Explain the relationship between the sociological environment and the development of patterns of dress and adornment
7301.D2.3	Analyze the importance of clothing in the context of its cultural, social, and psychological implications
7301.D2.4	Explain the relationship between clothing and self
7301.D2.5	Recognize design elements and principles
7301.D2.6	Explain the utilitarian role of clothing and its relationship to fashion
Domain	***Textile and Apparel Industry Core***
7301.D3.1	Students evaluate the textile and apparel industry processes leading to product development.
7301.D3.2	Examine the manufacturing processes for today's clothing.

7301.D3.3	Describe purposes of and techniques for assessing textile products and construction.
7301.D3.4	Examine forecasting and trending in the textile and apparel industry.
7301.D3.5	Investigate fashion designers and the steps in the design process
7301.D3.6	Evaluate and apply clothing construction methods.
Domain	***Career Navigation***
7301.D4.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7301.D4.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7301.D4.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7301.D4.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7301.D5.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7301.D5.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7301.D5.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7301.D5.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7301.D6.1	Demonstrate computer literacy skills and basic computer functions.
7301.D6.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7301.D6.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7301.D6.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Textiles, Apparel, and Merchandising	
Career Cluster	Arts, Entertainment, & Design
Program of Study	Fashion & Textile
NLPS Sequence	B
Course Code	7302
Course	*Textiles, Apparel, and Merchandising provides a comprehensive overview of the textiles,*

Description	*apparel and merchandising industry specific to fashion related goods including the nature of fashion, raw materials and production, designers, retailers, and supporting services.*	
Prerequisite(s)/ Corequisite(s)	Principles of Fashion and Textiles	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Any Home Economics K-12	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment	BSU - FASH 100: Introduction to the Fashion Industry	
Postsecondary Credential	BSU - B.A./B.S. in Fashion Industry Studies (52.1902)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Customer Relations Core***	
7302.D1.1	Students will analyze customer service procedures and results.	
7302.D1.2	Evaluate the components of quality customer service.	
7302.D1.3	Analyze factors that contribute to quality customer relations.	

7302.D1.4	Analyze the influences of cultural diversity as a factor in customer relations.
7302.D1.5	Demonstrate the skills necessary for quality customer service.
7302.D1.6	Create solutions to address customer concerns
7302.D1.7	Understand how customer feedback and trends guide fashion.
Domain	***Fashion Merchandising***
7302.D2.1	Students will examine key components of fashion merchandising.
7302.D2.2	Demonstrate general operational procedures required for business profitability and career success.
7302.D2.3	Apply the retail merchandising techniques, principles and procedures employed in the buying and merchandising of fashion goods
7302.D2.4	Examine ways the fashion industry is impacted by economic principles.
7302.D2.5	Analyze the impact of social media on fashion merchandising and marketing.
Domain	***Textile, Apparel and Merchandising***
7302.D3.1	Describe the changing nature and principles that govern fashion including social, economic, and psychological elements
7302.D3.2	Distinguish between the various types of designers, product developers, and marketing strategies related to fashion fibers, fabrics, and apparels.
7302.D3.3	Explain the varying roles in textile and apparel industry
7302.D3.4	Interpret the interrelationships between designers, fiber, fabric and apparel manufacturers, retailers, and customers.
7302.D3.5	Explain the auxiliary fashion enterprise services.
7302.D3.6	Identify trade periodicals and other media sources relevant to the apparel industry
7302.D3.7	Identify past, present and potential future practices, and trends
7302.D3.8	Identify career paths and opportunities in the fashion industry.
7302.D3.9	Create oral and visual presentations, utilizing professional presentation techniques

Advanced Textiles	
Career Cluster	Arts, Entertainment, & Design
Program of Study	Fashion & Textile
NLPS Sequence	C
Course Code	7303
Course Description	*Advanced Textiles will focus on the study of textiles concerning fiber, yarn, fabric construction, and finishes which affect the selection, use, and care of textiles.*
Prerequisite(s)/ Corequisite(s)	Principles of Fashion and Textiles; Textiles, Apparel, and Merchandising
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum

Counts Toward		
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Any Home Economics K-12	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment	BSU - FASH 130: Fashion Fabrics and Analysis	
Postsecondary Credential	BSU - B.A./B.S. in Fashion Industry Studies (52.1902)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Textiles***	
7303.D1.1	Analyze the physical and chemical structure of fibers as a basis for determining the performance characteristics of textile products used by consumers.	
7303.D1.2	Identify and evaluate characteristics of the major generic classifications of fibers that relate to the aesthetics, durability, comfort, and care of textile products as they relate to consumer use.	
7303.D1.3	Identify and assess the value of legislation relating to the labeling of textile products as it impacts the consumer.	
7303.D1.4	Identify and evaluate types and characteristics of yarns and evaluate their effect on the appearance, performance, and care of textile products.	
7303.D1.5	Identify and evaluate fabric construction methods and evaluate their appearance and	

	performance in textile products.
7303.D1.6	Identify and evaluate methods of coloring textiles and evaluate their use in textile products.
7303.D1.7	Identify and evaluate basic, surface, functional finishes in relation to the end use of textiles products as they impact consumer use.
7303.D1.8	Identify textile categories and fiber through visual inspection, burning tests, and microscopic examination.
7303.D1.9	Analyze textiles to identify fiber length, yarn characteristics, fabric construction, coloring processes, and finishing processes.
Domain	***Fashion Design***
7303.D2.1	Students will analyze design elements in the applied setting.
7303.D2.2	Explain the relationship between the culture, environment, location, and available resources on fashion design
7303.D2.3	Analyze examples of fashion and the use of design elements and principles
7303.D2.4	Demonstrate elements and principles of fashion design
7303.D2.5	Evaluate the business of fashion designers
7303.D2.6	Compare and contrast haute couture, runway fashion, and ready-to-wear
Domain	***Manufacturing and Distribution***
7303.D3.1	Students will evaluate the manufacturing process and distribution of goods.
7303.D3.2	Examine the manufacturing processes for production of fabrics, textiles, and garments
7303.D3.3	Assess textile products and construction of goods
7303.D3.4	Compare and contrast global manufacturing processes and costs
7303.D3.5	Investigate distribution systems
7303.D3.6	Evaluate garment cost based on manufacturing and distribution processes
Domain	***Fashion Promotion***
7303.D4.1	Students will explain the use of fashion promotion in the fashion industry.
7303.D4.2	Examine the areas of the fashion business and explain their interrelationships
7303.D4.3	Analyze factors that contribute to quality customer relations
7303.D4.4	Demonstrate the principles, dynamics and nature of fashion and consumer fashion demand
7303.D4.5	Utilize correct fashion terminology for the written and oral communication of fashion ideas and information
7303.D4.6	Apply the retail merchandising techniques, principles and procedures employed in the buying and merchandising of fashion goods
7303.D4.7	Evaluate promotional strategies
7303.D4.8	Analyze operational costs such as mark ups, mark downs, cash flow, POS (point of sale), and other factors affecting profit
Domain	***Research and Sustainability***
7303.D5.1	Students will examine current research and sustainability practices and trends.
7303.D5.2	Summarize current research trends in the fashion industry

7303.D5.3	Apply appropriate research methodologies in investigating the textile, apparel, and fashion industry
7303.D5.4	Examine ways the fashion industry is impacted by research in the fibers, yarns, fabrics, and finishes industries
7303.D5.5	Analyze the impact of sustainability practices on the fashion industry

Fashion and Textiles Capstone		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Fashion & Textile	
NLPS Sequence	D	
Course Code	7304	
Course Description	*Fashion Textile Capstone studies the evolution of Western dress from ancient times to the twentieth century. Emphasis on representative style and change over time. Additionally, this course will focus on the Identification of physical features which affect apparel quality. Analysis of ready-to-wear apparel to identify features which produce desirable aesthetic and functional performance is also covered.*	
Prerequisite(s)/ Corequisite(s)	Principles of Fashion and Textiles; Textiles, Apparel, and Merchandising; Advanced Textiles	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Any Home Economics K-12	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course		

Alignment	
Four Yr. Course Alignment	BSU – FASH 260: History of Fashion
Postsecondary Credential	BSU - B.A./B.S. in Fashion Industry Studies (52.1902)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Evolution of Costume***
7304.D1.1	Identify the distinguishing characteristics of a piece of apparel or silhouette
7304.D1.2	Identify by name, items of dress or aspects of appearance
7304.D1.3	Associate distinguishing features of apparel and appearance with a particular period or style name
7304.D1.4	Recognize a style or period by vocabulary, description, slide, line drawing, etc.
7304.D1.5	Describe the evolution of costume for men and women for a given period
7304.D1.6	Identify the first appearance of a particular aspect of dress
7304.D1.7	Identify elements, styles, or influences in current fashion that represent revivals or interpretations of the past
7304.D1.8	Analyze and interpret the change in apparel as it relates to change in culture over time
Domain	***Career Exploration and Experience***
7304.D2.1	Students will apply career skills to the fashion industry.
7304.D2.2	Create the materials needed for development of portfolio/resume/etc. to successfully acquire a job in the fashion industry.
7304.D2.3	Implement customer service practices in the real-world setting
7304.D2.4	Analyze the effects of security and inventory control strategies, cash and credit transaction methods, laws, and worksite policies, on loss prevention and store profit
7304.D2.5	Integrate technology as a tool in the industry setting
7304.D2.6	Understand ethical and legal standards and principles that impact the fashion industry
7304.D2.7	Communicate professional attitudes and behaviors necessary to secure and hold a job

Arts, Entertainment, & Design Interior Design							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7132	Principles of Interior Design	7127	Interior Design Fundamentals	7128	Materials, Finishes and Design	7248	Interior Design Capstone

Principles of Interior Design		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Interior Design	
NLPS Sequence	A	
Course Code	7132	
Course Description	*Principles of Interior Design introduces students to fundamental design theory and color dynamics as applied to compositional design. Investigations into design theory and color dynamics will provide experiences in applying design theory to three-dimensional concepts, human factors and the psychology and social influences of space. These experiences will develop student's skills in creative problem solving, peer evaluation, and presentation skills.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12 ● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Institutional & Home Management 9-12 ● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Housing Occupations ● CTE: Trade & Industrial: Building Trades Technology	

	● Workplace Specialist: Building Trades Technology ● Technology Education
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● CTE: Trade & Industrial Building Trades 5-12 ● CTE: Trade & Industrial: Interior Design 5-12 ● Workplace Specialist: Interior Design & Housing 9-12 ● Workplace Specialist: Building Trades/Construction 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	VISC 101: Fundamentals of Design, EDSN 101: Design Fundamentals
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Environmental Design (50.0408)
Liberal Arts/Sciences Requirements	ITCC - General Education Core Elective (3), IVYT 113: Student Success in Technology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Interior Design Fundamentals***
7132.D1.1	Develop and demonstrate a working design vocabulary.
7132.D1.2	Define and apply design process theory.
7132.D1.3	Communicate specific design concepts.
7132.D1.4	Recognize and employ the elements and principles of design.
7132.D1.5	Recognize and employ color theory and color perception.
7132.D1.6	Demonstrate creative and visual problem-solving skills through exercises and/or projects utilizing vector/raster-based graphics programs and/or other traditional processes.
7132.D1.7	Generate ideas, notes and thumbnails manually.
7132.D1.8	Review and discuss the historical foundation of design in art.
7132.D1.9	Engage in critical peer evaluation.
Domain	***Design Fundamentals for Space***
7132.D2.1	Utilize the principles of color mixing, color properties, schemes, and harmonies.
7132.D2.2	Integrate color psychology into environmental applications.
7132.D2.3	Identify, describe, and apply the design elements.
7132.D2.4	Identify, describe, and apply the design principles.
7132.D2.5	Create 3-D models analyzing space, form, pattern, light and shadow.

7132.D2.6	Utilize spatial organization techniques when creating designs.
7132.D2.7	Demonstrate an understanding of human behavior and how space can impact and influence the users.
7132.D2.8	Present design solutions through preparation models and oral justification.
7132.D2.9	Evaluate compositions using critical thought processes.
Domain	***Career Navigation***
7132.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7132.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7132.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7132.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7132.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7132.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7132.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7132.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7132.D5.1	Demonstrate computer literacy skills and basic computer functions.
7132.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7132.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7132.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Interior Design Fundamentals	
Career Cluster	Arts, Entertainment, & Design
Program of Study	Interior Design
NLPS Sequence	B
Course Code	7127

Course Description	*Interior Design Fundamentals provides students with an overview of the field of interior (environmental) design, including an understanding of fundamental construction knowledge and skills needed in the field. Exercises include small scale space analysis and functional planning based on user needs, furniture arrangement and selection, materials and finishes considerations and presentation techniques. Students will also learn basics regarding building practices, building structures, residential construction techniques, building materials and plan reading. Includes building codes, sustainable design practices, and the preparation of site and construction plans, elevations, sections, three-dimensional drawings details and hand renderings as they relate to construction and presentation drawings.*	
Prerequisite(s)/ Corequisite(s)	Principles of Interior Design	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12 ● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Institutional & Home Management 9-12 ● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Housing Occupations ● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Technology Education	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● CTE: Trade & Industrial Building Trades 5-12 ● CTE: Trade & Industrial: Interior Design 5-12 ● Workplace Specialist: Interior Design & Housing 9-12 ● Workplace Specialist: Building Trades/Construction 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	EDSN 103: Introduction to Environmental Design, EDSN 107: Design and Construction Graphics	
VU Course		

Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Environmental Design (50.0408)
Liberal Arts/Sciences Requirements	ITCC - General Education Core Elective (3), IVYT 113 Student Success in Technology
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Interior Design***
7127.D1.1	Coordinate the elements and principles of design into a harmonious space.
7127.D1.2	Demonstrate basic client interviewing skills.
7127.D1.3	Demonstrate a competency of furniture and fixture selection and arrangement through projects involving living areas, kitchens and support space, bedrooms, and bathrooms.
7127.D1.4	Develop project solutions with concern for function, lifestyle, sustainability, and aesthetics.
7127.D1.5	Utilize appropriate space allowances with concern for proxemics and human factors.
7127.D1.6	Demonstrate basic drafting skills.
7127.D1.7	Prepare client presentation: a. Select materials. b. Layout and compose presentation c. Use appropriate equipment and mounting materials d. Include color rendering of floor plan utilizing various media
7127.D1.8	Prepare an oral presentation to include a. Appropriate use of interior design vocabulary b. Justification of design solution
Domain	***Design and Construction***
7127.D2.1	Demonstrate accurate reading of construction documents and understanding of drawing sequencing.
7127.D2.2	Identify basic architectural styles.
7127.D2.3	Illustrate proficiency in basic drafting skills: architectural lettering, use of scale, architectural symbols, legends, and labeling.
7127.D2.4	Apply technical drafting skills using exercises to create construction documents including dimensioned floor plans, accurate line weights and lettering, foundation and framing plans, interior and exterior elevations, working section detail drawings, cross sections, and floor and window schedules.
7127.D2.5	Formulate building and structural solutions based on considerations such as sustainable strategies, orientation and climate, economics and building codes.
7127.D2.6	Create representational drawings illustrating contour, shade, and shadow techniques, and rendered floor plans, site plans, elevations and pictorial drawings, using appropriate drafting techniques.
7127.D2.7	Critique construction documents to include appropriate use of structural/architectural

	nomenclature.

Materials, Finishes, and Design		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Interior Design	
NLPS Sequence	C	
Course Code	7128	
Course Description	*Materials, Finishes, and Design examines the physical properties and characteristics of furniture, materials, finishes, and architectural detailing. The course includes an intensive study of textiles, including fiber sources, identification and classification to finish and sustainable qualities. Students will apply textile knowledge to interior textile fabrications including window treatments, upholstery, carpet and wall coverings. Content addresses environmental issues and problems in specifying, estimating, and installing these materials.*	
Prerequisite(s)/ Corequisite(s)	Principles of Interior Design; Interior Design Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12 ● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Institutional & Home Management 9-12 ● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Housing Occupations ● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Technology Education	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● CTE: Trade & Industrial Building Trades 5-12 ● CTE: Trade & Industrial: Interior Design 5-12	

	● Workplace Specialist: Interior Design & Housing 9-12 ● Workplace Specialist: Building Trades/Construction 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	EDSN 104: Textiles for Interiors, EDSN 201: Materials and Finishes
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Environmental Design (50.0408)
Liberal Arts/Sciences Requirements	ITCC - General Education Core Elective (3), IVYT 113: Student Success in Technology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Textile for Interiors***
7128.D1.1	Use correct textile vocabulary & terminology
7128.D1.2	Identify and describe the characteristics of textiles, including fiber names, yarn types, construction methods, finishing, dyeing, and printing techniques
7128.D1.3	Interpret fabric care and labeling information
7128.D1.4	Identify the legal, sustainability, and environmental issues related to textile production
7128.D1.5	Select appropriate textiles based on code requirements, test results, environmental impact, end use suitability and consumer satisfaction
7128.D1.6	Calculate the appropriate yardage needed for window treatments
Domain	***Materials and Finishes***
7128.D2.1	Research and find information sources for varying project considerations.
7128.D2.2	Identify appropriate materials selection for a variety of client needs.
7128.D2.3	Recognize the installation requirements of various materials.
7128.D2.4	Utilize proper finish selections based on accurate knowledge of product properties, use, specification liabilities, building codes and fire safety criteria.
7128.D2.5	Accurately specify, measure, cost, order and oversee installation of various materials.
7128.D2.6	Specify appropriate interior components such as moldings, doors, hardware, fireplaces, and architectural details.
7128.D2.7	Specify appropriate ceiling treatments, window coverings, floor coverings, wall coverings, upholstery, and a variety of building materials and finishes.
7128.D2.8	Measure and figure quantities and pricing for window treatments, wall coverings, floor coverings, and upholstery.

7128.D2.9	Coordinate guidelines for contract documents and specifications.
7128.D2.10	Demonstrate an understanding of how to use the sweets catalogs.
7128.D2.11	Understanding of cabinet construction including joinery, materials of construction, hardware, etc.
7128.D2.12	Write accurate specifications for architectural detailing including commercial floor and wall systems, interior finishes, doors, windows, trim and moldings, hardware, and custom case goods.
7128.D2.13	Prepare contract documents to include typed finish schedules, control sheets or purchase requisitions; Floor plans keyed to schedule.
7128.D2.14	Prepare work orders to communicate to the craftsperson the fabrication concept and pricing.
7128.D2.15	Prepare an oral presentation for project critique to include appropriate use of interior finishes vocabulary; justification of design solution.

Interior Design Capstone		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Interior Design	
NLPS Sequence	D	
Course Code	7248	
Course Description	*The Interior Design Capstone course is designed to provide students a chance to extend their knowledge and skills through additional course work and a work-based learning experience.*	
Prerequisite(s)/ Corequisite(s)	Principles of Interior Design; Interior Design Fundamentals; Materials, Finishes, and Design	
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Vocational Home Economics K-12 ● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Institutional & Home Management 9-12 ● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	

Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Housing Occupations ● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Technology Education
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● CTE: Trade & Industrial Building Trades 5-12 ● CTE: Trade & Industrial: Interior Design 5-12 ● Workplace Specialist: Interior Design & Housing 9-12 ● Workplace Specialist: Building Trades/Construction 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	EDSN 108: Environmental Design Planning, EDSN 115: Basic CAD for Environmental Designs
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Environmental Design (50.0408)
Liberal Arts/Sciences Requirements	ITCC - General Education Core Elective (3), IVYT 113: Student Success in Technology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Environmental Design and Space Planning***
7248.D1.1	Demonstrate understanding of space planning through: Accurate furniture and equipment arrangements to facilitate specific tasks, social gatherings, conferring, etc.; Appropriate furnishings based upon global human factors and ergonomics; Provisions for adequate traffic allowances.
7248.D1.2	Apply universal design principles.
7248.D1.3	Prepare a pre-design program including interview questionnaires or information sheets utilized to obtain research data.
7248.D1.4	Prepare an appropriate and accurate written design concept for a variety of design projects.
7248.D1.5	Prepare an oral presentation for class critique to include appropriate use of environmental vocabulary; justification of design solutions; awareness of sustainable design practices and materials.
Domain	***Basic CAD for Environmental Designers***
7248.D2.1	Identify CAD hardware and software.
7248.D2.2	Review the basic commands for file handling, formatting, and editing.

7248.D2.3	Demonstrate the ability to use the main drawing and editing commands to create architectural working drawings.
7248.D2.4	Demonstrate ability to create site plans, floor plans, elevations, sections, and detail drawings with the following layers: Furniture, fixtures, and equipment layout; Reflected ceiling/lighting plan; Electrical, plumbing, and HVAC plans; Dimensioning and labeling.
7248.D2.5	Demonstrate proper layer management utilizing paper space to create a set of complete drawings.
7248.D2.6	Establish text styles and dimension styles.
7248.D2.7	Utilize manufacturer's reference/block libraries and demonstrate their use in architectural exterior and interior drawings: Create a library of furniture/elements; Create symbols to be used in a symbol's library.
Domain	***Portfolio Development***
7248.D3.1	Prepare a portfolio of work related to interior design concepts

Arts, Entertainment, & Design Radio and Television							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7139	Principles of Broadcasting	7306	Audio and Video Production Essentials	7307	Mass Media Production	7308	Radio & TV Broadcasting Capstone

Principles of Broadcasting		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Radio and TV	
NLPS Sequence	A	
Course Code	7139	
Course Description	*The purpose of the Principles of Broadcasting course is to provide entry-level fundamental skills for students who wish to seek or pursue opportunities in the field of broadcasting or mass media. Students will explore the technical aspects of audio and sound design for radio production and distribution, as well as, the technical aspects of video production and distribution.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Radio & Television 9-12 ● Industrial Arts 7-12, K-12 ● English 7-12 and work experience in communications/media ● Journalism 7-12	
Rules 46-47	● Radio & Television 9-12 ● Occupational Specialist: Marketing: Radio & Television 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● English 9-12 and work experience in communications/media ● Journalism 9-12	
Rules 2002	● Workplace Specialist: Marketing: Radio/TV/ Telecommunications ● Technology Education with high school setting	

	● Language Arts with high school setting and work experience in communications/media ● Journalism with high school setting
REPA/REPA 3	● Workplace Specialist: Radio & TV 9-12 ● Technology Education 5-12 ● Journalism 5-12 ● Language Arts 5-12 and work experience in communications/media ● Workplace Specialist: Interactive Media 9-12 ● CTE: Trade & Industrial: Interactive Media 5-12 ● CTE: Trade & Industrial: Radio & TV 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	VISC 105: Video and Sound
VU Course Alignment	BCST 102: Introduction to Audio-Video Production
Four Yr. Course Alignment	
Postsecondary Credential	VU - A.S. Broadcasting (10.0202)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Audio/Video Production***
7139.D1.1	Students will be introduced to hardware and software used in the audio and video industry.
7139.D1.2	Students will be able to identify and become familiarized with, hardware and software used in the audio and video industry.
7139.D1.3	Students will demonstrate how the hardware and software operate.
7139.D1.4	Students will gain knowledge in the theory of mass media (print, radio, television, digital) and its uses in modern society.
7139.D1.5	Students will gain an appreciation of the industry as well as have a deeper understanding of careers in modern society.
Domain	***Additional***
7139.D2.1	Demonstrate general safety rules for equipment operation and lab
7139.D2.2	Perform safe practices when operating equipment
7139.D2.3	Demonstrate proper equipment storage for safe transportation
7139.D2.4	Determine proper cables for set-up and operation of production equipment
7139.D2.5	Use standard safety practices for all classroom laboratory and field investigations

7139.D2.6	Identify and describe stages of the scripting process
7139.D2.7	Construct scripts using established formats
7139.D2.8	Define terminology used in broadcast scriptwriting
7139.D2.9	Apply concepts of stages of production
7139.D2.10	Explain the history and development of the audio and video industry and its impact on today's media
7139.D2.11	Explain how audible messages are converted into signals for transmission of information and data
7139.D2.12	Explain camera functions and how electrical signals are converted into images on a screen
Domain	***Career Navigation***
7139.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7139.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7139.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7139.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7139.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7139.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7139.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7139.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7139.D5.1	Demonstrate computer literacy skills and basic computer functions.
7139.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7139.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7139.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Audio and Video Production Essentials		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Radio & TV	
NLPS Sequence	B	
Course Code	7306	
Course Description	*Audio and Video Production Essentials provides an in-depth study on audio and video production techniques for radio, television, and digital technologies. Students will learn skills necessary for audio production and on-air work used in radio and other digital formats. Additionally, experience will be gained in the development of the video production process; including skills in message development, directing, camera, video switcher, and character generator operations.*	
Prerequisite(s)/ Corequisite(s)	Principles of Broadcasting	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as Communication-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	●Radio & Television 9-12 ● Industrial Arts 7-12, K-12 ● English 7-12 and work experience in communications/media ● Journalism 7-12	
Rules 46-47	● Radio & Television 9-12 ● Occupational Specialist: Marketing: Radio & Television 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● English 9-12 and work experience in communications/media ● Journalism 9-12	
Rules 2002	● Workplace Specialist: Marketing: Radio/TV/ Telecommunications ● Technology Education with high school setting ● Language Arts with high school setting and work experience in communications/media ● Journalism with high school setting	
REPA/REPA 3	● Workplace Specialist: Radio & TV 9-12 ● Technology Education 5-12 ● Journalism 5-12 ● Language Arts 5-12 and work experience in communications/media ● Workplace Specialist: Interactive Media 9-12 ● CTE: Trade & Industrial: Interactive Media 5-12	

	● CTE: Trade & Industrial: Radio & TV 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	BCST 120: Audio Production, BCST 140: Video Production I: Studio Production
Four Yr. Course Alignment	
Postsecondary Credential	A.S. Broadcasting (10.0202)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Audio Production***
7306.D1.1	Gain knowledge on microphone types, construction, and their usages
7306.D1.2	Understand audio recording/editing equipment and its purpose
7306.D1.3	Knowledge of Scripting Formats for audio production
7306.D1.4	Knowledge of audio editing software for industry standards
7306.D1.5	Demonstrate knowledge of Television Production process and component of the Television production team
Domain	***TV Production I***
7306.D2.1	Knowledge of Camera Framing and Composition
7306.D2.2	Knowledge of Scripting Formats for video production
7306.D2.3	Television Studio and Field Operations
7306.D2.4	Demonstrate different editing methods, equipment, and techniques in the production of a story
7306.D2.5	Demonstrate the use of a computer in broadcast/video production applications
7306.D2.6	Demonstrate basic lighting techniques
7306.D2.7	Design video projects incorporating professional video principles
7306.D2.8	Demonstrate proper use of audio equipment to record quality audio track
7306.D2.9	Design audio projects incorporating professional audio principles
7306.D2.10	Demonstrate proper use and operation of studio equipment and production techniques while working as part of a production team
7306.D2.11	Identify elements of set design and aesthetics
7306.D2.12	Reinforce professionalism in verbal, nonverbal, and written communication.
7306.D2.13	Introduce and incorporate ethics and media literacy

Mass Media Production		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Radio & TV	
NLPS Sequence	C	
Course Code	7307	
Course Description	*Mass Media Production will focus on the study of theory and practice in the voice and visual aspects of radio and television performance. In addition, this course introduces the skills used to acquire and deliver news stories in a digital media format. Students will learn how to research issues and events, interview news sources, interact with law enforcement and government officials, along with learning to write in a comprehensive news style.*	
Prerequisite(s)/ Corequisite(s)	Principles of Broadcasting; Audio and Video Production Essentials	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as Communication-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Radio & Television 9-12 ● Industrial Arts 7-12, K-12 ● English 7-12 and work experience in communications/media ● Journalism 7-12	
Rules 46-47	● Radio & Television 9-12 ● Occupational Specialist: Marketing: Radio & Television 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● English 9-12 and work experience in communications/media ● Journalism 9-12	
Rules 2002	● Workplace Specialist: Marketing: Radio/TV/ Telecommunications ● Technology Education with high school setting ● Language Arts with high school setting and work experience in communications/media ● Journalism with high school setting	
REPA/REPA 3	● Workplace Specialist: Radio & TV 9-12 ● Technology Education 5-12 ● Journalism 5-12 ● Language Arts 5-12 and work experience in communications/media ● Workplace Specialist: Interactive Media 9-12 ● CTE: Trade & Industrial: Interactive Media 5-12 ● CTE: Trade & Industrial: Radio & TV 5-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	BCST 110: Media Performance*, BCST 112: News Gathering & Storytelling*
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Media Performance***
7307.D1.1	Understand the role and responsibilities of the announcer/newscaster in broadcast, cable, and film media
7307.D1.2	Understand the specialized skills and requirements needed for a career in announcing
7307.D1.3	Analyze broadcast copy for key points, meaning, and emphasis
7307.D1.4	Demonstrate a working knowledge of the physiology of speech, voice technique and proper pronunciation
7307.D1.5	Demonstrate the ability to announce for radio, audio recording, and voice-over work according to accepted professional standards
7307.D1.6	Demonstrate the ability to announce on camera for television, with an emphasis placed on news delivery.
Domain	***News Gathering & Storytelling***
7307.D2.1	Demonstrate an understanding of how to research news stories
7307.D2.2	Develop skills to write short and long-form broadcast style news stories
7307.D2.3	Acquire basic understanding of software used in a newsroom
7307.D2.4	Develop an understanding of how a newsroom operates
7307.D2.5	Acquire experience in interviewing subjects for news stories
7307.D2.6	Demonstrate the ability to create news stories using video and audio
7307.D2.7	Demonstrate the ability to meet news deadlines
7307.D2.8	Demonstrate proper use and operation of studio equipment and production techniques while working as part of a production team
7307.D2.9	Demonstrate proficiency in on-air performance
7307.D2.10	Apply and adapt programming elements using audience analysis
7307.D2.11	Students integrate concepts of programming
7307.D2.12	Demonstrate practices of delivery or performance while on-air
7307.D2.13	Recommend technically acceptable visual components for on-air talent
7307.D2.14	Use different internet platforms to tell stories and produce content

Radio & TV Broadcasting Capstone		
Career Cluster	Arts, Entertainment, & Design	
Program of Study	Radio & TV	
NLPS Sequence	D	
Course Code	7308	
Course Description	*This course will cover a variety of domains further building on skills in video production, and broadcast industry practices specific to radio, television, and digital media. Attention will be given to cross-industry synergies, emerging technologies, and the global market for media. Students are highly encouraged to do a video newscast or radio practicum to gain real world experience. In most cases this practicum may be completed through a school-based enterprise.*	
Prerequisite(s)/ Corequisite(s)	Principles of Broadcasting; Audio and Video Production Essentials; Mass Media Production	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as Communication-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Radio & Television 9-12 ● Industrial Arts 7-12, K-12 ● English 7-12 and work experience in communications/media ● Journalism 7-12	
Rules 46-47	● Radio & Television 9-12 ● Occupational Specialist: Marketing: Radio & Television 9-12 ● Industrial Technology K-12 ● Industrial Education K-12 ● English 9-12 and work experience in communications/media ● Journalism 9-12	
Rules 2002	● Workplace Specialist: Marketing: Radio/TV/ Telecommunications ● Technology Education with high school setting ● Language Arts with high school setting and work experience in communications/media ● Journalism with high school setting	
REPA/REPA 3	● Workplace Specialist: Radio & TV 9-12 ● Technology Education 5-12 ● Journalism 5-12 ● Language Arts 5-12 and work experience in communications/media ● Workplace Specialist: Interactive Media 9-12 ● CTE: Trade & Industrial: Interactive Media 5-12	

	● CTE: Trade & Industrial: Radio & TV 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	JOUR 216: Mass Communications*, BCST 206: Video Production II - Field Production
Four Yr. Course Alignment	USI - RTV 150: Practicum Broadcasting
Postsecondary Credential	USI – B.A./B.S. Radio and Television (09.0701) VU – A.S. Broadcasting (10.0202)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency	**Competency**
Domain	***Mass Communications***
7308.D1.1	Define the concept of media literacy
7308.D1.2	Define the concept of media convergence
7308.D1.3	Interpret the historical significance of traditional mass mediums
7308.D1.4	Analyze how traditionally separate forms of mass media interact in a modern, interconnected, diverse society
7308.D1.5	Apply ethical thinking to critical issues in mass media
Domain	***TV Production II - Field Production***
7308.D2.1	Demonstrate the proper set up and use professional field video production equipment including, camera, tripod, microphones, cables, and lighting
7308.D2.2	Understand the different roles of a production crew in field production
7308.D2.3	Edit digital media for field production
7308.D2.4	Understand media formats and digital process used in the production of media
Domain	***Lighting Principles***
7308.D3.1	Identify the components needed for basic lighting
7308.D3.2	Construct a lighting design for a basic interview
7308.D3.3	Construct a lighting design that conveys a specific mood
Domain	***Set Design Principles***
7308.D4.1	Identify elements of set design and aesthetics

7308.D4.2	Apply design principles to a field location taping
7308.D4.3	Apply design principles to a specified studio taping
Domain	***Storytelling***
7308.D5.1	Recognize and explain storytelling elements as presented in video and film
7308.D5.2	Formulate script ideas utilizing storytelling principles
7308.D5.3	Evaluate effectiveness of storytelling
Domain	***Law and Ethics***
7308.D6.1	Identify and evaluate communication law issues
7308.D6.2	Apply communication law to broadcasts and projects
Domain	***Career Opportunities and Employment Skills***
7308.D7.1	Identify careers available in digital communications and the entertainment media
7308.D7.2	Investigate careers available by conducting job searches in digital communications and the entertainment media
7308.D7.3	Construct a professional resume
7308.D7.4	Produce a professional portfolio that demonstrates abilities
7308.D7.5	Recognize and apply industry standard terminology
7308.D7.6	Recognize the organizational structure of the industry
7308.D7.7	Recognize and demonstrate preparation for and performance in professional interviews

Business Management

Technical/Business Communication	
Career Cluster	Business Management; Financial Services; Marketing, Sales, & Entrepreneurship
Program of Study	
NLPS Sequence	Introductory
Course Code	4508
Course Description	*Technical/Business Communications provides students with the communication and problem-solving skills to function effectively in the workplace. Areas studied include written/oral/visual communication, listening, informational reading, Internet research/analysis, and electronic communication. Concepts addressed will include adapting communication to the situation, purpose, and audience. Students produce related documents such as employee handbooks, instructional manuals, employment communication, organizational communication, business reports, and social/professional situations using word processing, presentation, multimedia, and desktop publishing software.*
Prerequisite(s)/ Corequisite(s)	None
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as Communication-Focused credit for new diploma
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Business Education with Shorthand 7-12 ● English 7-12
Rules 46-47	● Business Education 9-12 ● English 9-12
Rules 2002	● Business with high school setting ● CTE: Business Services & Technology with high school setting ● Language Arts with high school setting
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Language Arts 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	

ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction***
4508.D1.1	Students understand the nature of oral, visual, and written communication in the workplace.
4508.D1.2	Identify Who, What, why, and How in Technical/Business Communication
4508.D1.3	Understand the importance of technical/business communication in the workplace
4508.D1.4	Introduce concepts of situation, purpose, and audience
4508.D1.5	Understand that workplace communication is always situational (that it always has a reason or is a response) and is always part of a complex communication network
4508.D1.6	Recognize that technical/business documents include but are not limited to proposals, technical articles, abstracts, reports, letters, memos, e-mail, manuals, outlines, flyers
Domain	***Gathering and Assessing Information/Resources***
4508.D2.1	Students locate, assess, and use information from a variety of print and online sources.
4508.D2.2	Locate print and online information to aid in decision making and strengthening arguments
4508.D2.3	Determine authority and validity of sources/resources
4508.D2.4	Understand how statistics can be interpreted and manipulated
4508.D2.5	Identify and assess common logical fallacies, such as over-generalization and distorted data
4508.D2.6	Understand ethical issues involved in gathering, displaying, and interpreting data
4508.D2.7	Identify content and design errors in visual displays of data such as tables, graphs, and charts
4508.D2.8	Use research strategies to confirm accuracy of information in technical/business communication
Domain	***Informational Reading***
4508.D3.1	Students read and analyze content, interpretation, and inference.
4508.D3.2	Identify and analyze the situation, purpose, and audience when reading print and online material
4508.D3.3	Apply reading skills to gather information from print and online material
4508.D3.4	Analyze the integrity of printed and online material

4508.D3.5	Use context clues to recognize word meaning
4508.D3.6	Select appropriate reading method for a particular situation (e.g., skimming, scanning, speed reading, and in-depth reading)
4508.D3.7	Distinguish between literal and inferential statements
4508.D3.8	Discuss print and online persuasive information and its impact on decision making
4508.D3.9	Interpret technical/business correspondence, professional articles, and supporting graphic materials
4508.D3.10	Interpret and use information from manuals, computer printouts, and electronic sources
4508.D3.11	Explain career-specific terminology
4508.D3.12	Analyze and synthesize information from print and electronic sources to create a group project or product
Domain	***Written Communication***
4508.D4.1	Students plan and write documents that are appropriate for the situation, purpose, and audience.
4508.D4.2	Analyze the situation, purpose, and audience to guide the planning, writing, and revising of written material
4508.D4.3	Develop and use a writing process appropriate to the situation
4508.D4.4	Design letters, memos, and reports that conform to workplace standards and conventions
4508.D4.5	Demonstrate and understand effective layout, design, and typography
4508.D4.6	Create technical/business documents and presentations that are informational, persuasive, and analytical
4508.D4.7	Avoid biased language (e.g., sex, gender, race, etc.)
4508.D4.8	Revise and edit documents to improve content and effectiveness
4508.D4.9	Prepare industry-specific technical reports that incorporate graphic aids
4508.D4.10	Analyze and respond to complex business case studies
4508.D4.11	Research, analyze, and prepare collaboratively a written response to a complex business project
Domain	***Oral Communication***
4508.D5.1	Students communicate in a clear, courteous, concise, and appropriate manner.
4508.D5.2	Analyze the situation, purpose, and audience to guide the planning and presentation of oral communication
4508.D5.3	Select language, visuals, and method of delivery appropriate to the situation
4508.D5.4	Use proper telephone techniques and etiquette
4508.D5.5	Ask questions with confidence to elicit general and specific information
4508.D5.6	Respond to questions directly and appropriately
4508.D5.7	Organize thoughts to reflect logical thinking before speaking
4508.D5.8	Identify regional and cultural differences in spoken communication; use oral language that is comprehensible to the audience
4508.D5.9	Plan and present short presentations individually and as a member of a group

4508.D5.10	Interact effectively with people from varying international, cultural, ethic, and racial backgrounds
4508.D5.11	Function as a team member to identify and solve several problems inherent in a capstone project
4508.D5.12	Present findings of capstone projects in a formal presentation using appropriate graphics, media, and support materials
4508.D5.13	Deliver impromptu and planned speeches with confidence
4508.D5.14	Advocate a specific cause
4508.D5.15	Serve effectively as an interviewer or interviewee in public relations, civic, media, and community situations
Domain	***Listening***
4508.D6.1	Students listen discriminately and respond appropriately to oral communication.
4508.D6.2	Analyze the situation, purpose, and audience of an oral message
4508.D6.3	Listen discriminately to separate verifiable information from opinion
4508.D6.4	Critique media and oral presentations analytically and critically
4508.D6.5	Assess and respond to a speaker's nonverbal messages
4508.D6.6	Identify and overcome major barriers to enhance active listening
4508.D6.7	Direct courteous attention to multiple speakers within a group to obtain key facts
Domain	***Communication Through Technology***
4508.D7.1	Students enhance the effectiveness of communication using technology.
4508.D7.2	Analyze the situation, purpose, and audience when using technology to communicate
4508.D7.3	Operate electronic message technologies to include facsimile machines, voice mail, conference calls, pagers, and e-mail
4508.D7.4	Use computer networks (e.g., communicating computers, Internet, or on-line databases) to facilitate collaborative or individual learning and communicating
4508.D7.5	Discuss the use of the following communicating systems: WATS lines, LAN system, cellular technology, and voice recognition dictation
4508.D7.6	Enhance documents using advanced layout, design, and graphics production software and scanning hardware
4508.D7.7	Address the ethical issues regarding intellectual property and dissemination of information generated electronically
4508.D7.8	Apply the rules of electronic messaging etiquette
4508.D7.9	Evaluate and select messages that may be addressed best by electronic media
4508.D7.10	Incorporate the use of international electronic resources such as Internet in complex projects
Domain	***Employment Communication***
4508.D8.1	Students integrate communication in the pursuit of employability.
4508.D8.2	Research the job market and specific potential employers using personal and electronic networks
4508.D8.3	Write a formal application letter, print and scannable versions of a resume, and a follow-up

	(thank you) letter for job opportunities
4508.D8.4	Develop an employment portfolio
4508.D8.5	Demonstrate proper business and dining etiquette
4508.D8.6	Complete employment application forms
4508.D8.7	Demonstrate appropriate interviewing techniques (dress, questions, etc.)
4508.D8.8	Understand employer expectations (punctuality, dependability, willingness to learn, cooperation, etc.)
4508.D8.9	Identify employee expectations (health and safety, evaluations, fairness, pay, benefits, rights, labor/management relations, etc.)

Business Math	
Career Cluster	Business Management; Financial Services; Marketing, Sales, & Entrepreneurship
Program of Study	
NLPS Sequence	Introductory
Course Code	4512
Course Description	*Business Math is a course designed to prepare students for roles as entrepreneurs, producers, and business leaders by developing abilities and skills that are part of any business environment. A solid understanding of math including algebra, basic geometry, statistics, and probability provides the necessary foundation for students interested in careers in business and skilled trade areas. The content includes mathematical operations related to accounting, banking and finance, marketing, and management. Instructional strategies should include simulations, guest speakers, tours, Internet research, and business experiences.*
Prerequisite(s)/ Corequisite(s)	Algebra I
Credits	1 to 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Counts as a Math Credit for new diploma
Dual Credit Status	
Additional Notes	May be offered as an applied course.
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Business Education 7- 12 ● Distributive Education K-12 ● Mathematics 7-12
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12

	● Business Education with Vocational Endorsement 9-12 ● Mathematics 9-12 ● General Math 5-12
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Mathematics with high school setting
REPA/REPA 3	● Business 5-12 ● Mathematics 5-12 ● CTE: Marketing 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Math Concepts***
4512.D1.1	Students demonstrate the knowledge and skills necessary to determine the correct algebraic process to solve problems for a variety of business situations.
4512.D1.2	Reinforce basic math skills, such as but not limited to percents, decimals, and fractions, and algebraic skills of solving equations with one or two variables
4512.D1.3	Select and use appropriate formulas to solve problems
4512.D1.4	Construct and solve an equation for a given problem using units
4512.D1.5	Determine if a solution to an algebraic computation is reasonable
4512.D1.6	Use algebraic graphs in real world situations
4512.D1.7	Apply complex functions to business financials
4512.D1.8	Students apply geometry principles to solve problems for a variety of business situations.
4512.D1.9	Demonstrate ability to take measurements and convert as needed
4512.D1.10	Use formulas and geometric reasoning necessary for area, perimeter, circumference,

	diameter, and volume
4512.D1.11	Determine if a solution to a geometry computation is reasonable
4512.D1.12	Students analyze and interpret data using common probability and statistical procedures to solve problems for a variety of business situations.
4512.D1.13	Construct, read, and interpret tables, charts, and graphs
4512.D1.14	Use probability concepts to predict events
4512.D1.15	Construct and interpret frequency distribution
4512.D1.16	Calculate measures of range and central tendency (e.g., mean, median, mode)
4512.D1.17	Determine if a solution to probability and statistical computation is reasonable
Domain	***Accounting Principles***
4512.D2.1	Students apply math concepts to analyze and solve problems related to accounting principles for business.
4512.D2.2	Calculate equity using the accounting equation
4512.D2.3	Calculate and plan for taxes including sales, income, and property
4512.D2.4	Calculate cost of goods sold, gross profit, operating expenses, and net profit
4512.D2.5	Determine cost of goods sold using different inventory valuation methods (e.g., LIFO, FIFO)
4512.D2.6	Calculate manufacturing costs and break-even point
4512.D2.7	Calculate and plan for a variety of expenses
4512.D2.8	Calculate company or department overhead based on various situations (e.g., sales or floor space)
4512.D2.9	Calculate depreciation of assets using various methods (e.g., declining-balance method, sum-of-the-years method)
4512.D2.10	Compare the costs of renting, leasing, or buying plant or current assets
4512.D2.11	Students apply math concepts to analyze and solve problems related to payroll for business.
4512.D2.12	Calculate and maintain employee payroll records
4512.D2.13	Calculate employee and employer taxes and prepare related reports
4512.D2.14	Calculate fringe benefits and analyze their effect on the total wage package
4512.D2.15	Analyze costs of recruiting, placing, and training employees
Domain	***Banking and Financial Services***
4512.D3.1	Maintain checking account records (e.g., checks, check register, and deposit slips)
4512.D3.2	Show a reconciliation of a bank statement
4512.D3.3	Compare and contrast different financial institutions and their services
4512.D3.4	Assess data from the stock markets used in making investment decisions
4512.D3.5	Students apply math concepts to analyze and solve problems related to the principles of business finance.
4512.D3.6	Calculate various types of interest, (e.g., simple, compound, variable, exact, or ordinary)
4512.D3.7	Calculate the costs associated with installment purchases
4512.D3.8	Compare cash price to installment price in order to make a purchasing decision

4512.D3.9	Compute the monthly payment, interest, and total amount required to amortize a loan (e.g., mortgage)
4512.D3.10	Compare and contrast benefits and cost of long-term debt options for promissory notes and bonds
4512.D3.11	Compare and contrast benefits and costs of investment options (e.g., money-markets, CD's, stocks, bonds)
4512.D3.12	Understand and calculate present value and future value
4512.D3.13	Determine the finance charges on credit card balances
4512.D3.14	Compare and contrast the advantages and disadvantages of employee credit card use for business expenses
4512.D3.15	Compare and contrast the advantages and disadvantages of offering credit to customers
Domain	***Marketing Principles***
4512.D4.1	Students apply math concepts to analyze and solve problems related to marketing principles for business.
4512.D4.2	Compare and contrast expenses associated with various advertising mediums
4512.D4.3	Compute extensions, subtotals, sales tax, and sales totals for a sales transaction
4512.D4.4	Compute markup or markdown
4512.D4.5	Calculate and analyze different types of trade discounts
4512.D4.6	Calculate the response rate and results of surveys
4512.D4.7	Analyze demographic information to make sound marketing decisions
4512.D4.8	Using trend data and forecasting models, calculate future sales
4512.D4.9	Calculate and analyze market share
4512.D4.10	Plan and design various displays for products with different size and shape requirements
Domain	***Management Principles***
4512.D5.1	Students apply math concepts to analyze and solve problems related to management principles.
4512.D5.2	Interpret financial statements to make sound managerial decisions
4512.D5.3	Create and analyze budgets
4512.D5.4	Calculate inventory balances and stock reorder points
4512.D5.5	Calculate necessary ratios to make sound managerial decisions
4512.D5.6	Calculate the cost of full-time versus part-time employees
4512.D5.7	Compare and contrast the different types and costs relating to insurance (e.g. property, automobile, bonding)
Domain	***Communication***
4512.D6.1	Students develop skills to create and present accurate and effective communication for specific business-related purposes and audiences.
4512.D6.2	Use clear and legible handwriting in all written work and communication
4512.D6.3	Demonstrate active listening skills

4512.D6.4	Use discussion skills to assume leadership and participant roles
4512.D6.5	Use research, composition, and oral skills to present information for a variety of situations utilizing appropriate technology
4512.D6.6	Work cooperatively with peers and authority figures
4512.D6.7	Use clear and concise writing skills to describe, explain, and inform various audiences
4512.D6.8	Follow and interpret directions, graphs, charts, and diagrams found in technical writing
4512.D6.9	Use appropriate industry terminology

Introduction to Business		
Career Cluster	Business Management; Financial Services; Marketing, Sales, & Entrepreneurship	
Program of Study		
NLPS Sequence	Introductory	
Course Code	4518	
Course Description	*Introduction to Business introduces students to the world of business, including the concepts, functions, and skills required for meeting the challenges of operating a business in the twenty-first century on a local, national, and/or international scale. The course covers business management, entrepreneurship, marketing fundamentals, and business ethics and law. The course develops business vocabulary and provides an overview of business and the role that business plays in economic, social, and political environments.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 to 2 semester course, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes	**Note**: This course qualifies for funding at the 8th grade level	
ADDITIONAL COURSE INFO		
Funding	Introductory	Available for 8th grade
Bulletin 400	● Business Education 7- 12 ● Distributive EducationK-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting	

	● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
4518.D4.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
4518.D4.2	Explain the benefits and responsibilities of being a member of a CTSO.
4518.D4.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
4518.D4.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
4518.D5.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
4518.D5.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster
4518.D5.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
4518.D5.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society
4518.D5.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and

	examine how personal career aptitudes align with careers in a field or pathway of interest
4518.D5.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
4518.D5.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster
Domain	***Business Management***
4518.D1.1	Students integrate knowledge of business management functions and strategies, managerial leadership and decision processes, management of human resource development, and business communication to increase organizational efficiency.
4518.D1.2	Illustrate the styles, levels, and functions of business management
4518.D1.3	List the qualities essential for various types of managers
4518.D1.4	Recognize the appropriate leadership style for a given situation
4518.D1.5	Explain the importance of risk management
4518.D1.6	Use a rational decision-making process in establishing short- and long-term goals
4518.D1.7	Identify the cycle of recruitment, hiring, training, evaluation, and dismissal of employees
4518.D1.8	Explain the need to be aware of Equal Employment Opportunity Act
4518.D1.9	Diagnose appropriateness of various examples of verbal and nonverbal business communications
4518.D1.10	Adapt language for audience, purpose, and situation
4518.D1.11	Use oral and written communication skills in creating, expressing, and interpreting information and ideas including technical terminology and information
Domain	***Marketing***
4518.D2.1	Students apply the concepts of marketing functions, plans, and strategies to develop appropriate methods to serve potential customers.
4518.D2.2	Define marketing and its impact on society
4518.D2.3	Distinguish the functions of marketing and their importance in successful product marketing
4518.D2.4	Recognize and explain the four utilities of marketing
4518.D2.5	Interpret how the marketing concept relates to business management
4518.D2.6	Show how changes in the marketing mix (4 Ps of Marketing) effect the success factor of marketing strategies
4518.D2.7	Establish a target market for a particular product or service
4518.D2.8	Identify patterns of appropriate customer service that increase company profits
4518.D2.9	Investigate the effect of customer input and feedback
4518.D2.10	Investigate the overall influence of the customer in marketing strategies
Domain	***Entrepreneurship***
4518.D3.1	Students apply concepts of economic conditions, market competitions, financing strategies, innovation and opportunity recognition while integrating their knowledge of business management and marketing principles to design and develop a successful new venture.
4518.D3.2	Define entrepreneurship

4518.D3.3	List the characteristics of a successful entrepreneurship
4518.D3.4	Define the role of a business plan
4518.D3.5	Identify the various methods of financing a business
4518.D3.6	Identify the methods of entering an entrepreneurial venture to include starting a new business, buying an existing business, becoming a franchisee, and forms of ownership
4518.D3.7	Describe the impact of the local economy on the establishment of a new business
4518.D3.8	Describe the impact of the national economy on the establishment of a new business
4518.D3.9	Describe the impact of the international economy on the establishment of a new business
4518.D3.10	Appraise the contribution of entrepreneurship to the economy
4518.D3.11	Recognize and explain the influence of demographics on business development
4518.D3.12	Understand and respond to customer demands for business development strategies
4518.D3.13	Examine elements of competition in the market
4518.D3.14	Analyze creative elements in opportunity recognition to start a new enterprise
4518.D3.15	Demonstrate examples of creativity and innovation in new business development

Entrepreneurship and New Ventures Capstone	
Career Cluster	All programs of study except Entrepreneurship
Program of Study	
NLPS Sequence	
Course Code	5966
Course Description	*Entrepreneurship and New Ventures Capstone introduces entrepreneurship and develops skills and tools critical for starting and succeeding in a new venture. The entrepreneurial process of opportunity recognition, innovation, value proposition, competitive advantage, venture concept, feasibility analysis, and "go to" market strategies will be explored through mini-case studies of successful and unsuccessful entrepreneurial start-ups. Additionally, topics of government and legal restrictions, intellectual property, franchising location, basic business accounting, raising startup funding, sales and revenue forecasting, and business plan development will be presented through extensive use of word processing, spreadsheet and presentation software.*
Prerequisite(s)/ Corequisite(s)	Any CTE Concentrator Sequence except Entrepreneurship
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	

Funding	High Value	Level II
Bulletin 400	● Business Education 7- 12 ● Business Education with Vocational Business Endorsement 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Business Endorsement 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Occupational Specialist: Business: Entrepreneurship / Small Business Ownership 9-12	
Rules 2002	● Business with high school setting ● CTE: Business Services & Technology with high school setting ● CTE: Marketing with high school setting ● Workplace Specialist: Marketing: Entrepreneurship / Small Business Ownership	
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Entrepreneurship 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Entrepreneurial Concepts***	
5966.D1.1	Identify current trends in entrepreneurship and the many paths one can take to be an entrepreneur (side hustle, freelancer, franchise owner, high growth startup, small business owner, purchasing an existing business, etc.).	
5966.D1.1	Identify and understand steps in the Entrepreneurial process or a startup model like RISE (Regional Innovation & Startup Education) or Lean Startup.	
5966.D1.1	Identify entrepreneurial concepts, including ideation, prototyping, opportunity evaluation, launch.	

5966.D1.1	Identify the management, financial, marketing, and legal skills necessary to operate and grow an entrepreneurial business venture.
5966.D1.1	Describe issues regarding the operation of an entrepreneurial business.
5966.D1.1	Identify global aspects of an entrepreneurial business.
5966.D1.1	Conduct background research on economic conditions, market trends, competitive factors and consumer behavior using higher order thinking methods.
5966.D1.1	Build and apply professional skills in oral and written communication, critical thinking, self-evaluation.
5966.D1.1	Conduct a personal inventory, including mapping your network, resources (both local and state), and the time you are willing to give to pursue your entrepreneurial endeavor.
5966.D1.1	Identify problems and opportunities after completing your personal inventory and assess next steps in validating the problem you would like to solve. Identify who has the problem (target market), how big the problem is (market size) and who you will need to enroll or what you will need to do to begin solving the problem.
5966.D1.1	Create a problem statement and elevator pitch for the problem you would like to solve.
5966.D1.1	Create several business model canvases for local or state businesses to learn how to use and apply the tool to your own idea.
5966.D1.1	Understand how different types of businesses are funded and which tools support funding different types of businesses (pitching to investors for high growth, writing traditional business plan for bank loans, bootstrapping through friends and family, or creating a campaign using tools like GoFundMe or Kickstarter)
Domain	***Entrepreneurial Mindset***
5966.D2.1	Understand all the pathways to being an entrepreneur.
5966.D2.2	Identify all the ways having an entrepreneurial mindset can help anyone in any field.
5966.D2.3	Analyze the common characteristics, habits, and mindset of successful entrepreneurs from different industries.
5966.D2.4	Apply the concept of fail fast, fail forward, and maximizing resiliency by understanding how to accept feedback and being vulnerable to pursue your entrepreneurial endeavors.
5966.D2.5	Recognize the role of leadership, ethics, and diversity in entrepreneurial ventures.
5966.D2.6	Understand the importance and strategies for creating a long-term vision to navigate the numerous obstacles in the entrepreneurship journey.
5966.D2.7	Write a personal vision and mission statement.
5966.D2.8	Create and start a personal and professional development plan, based on an understanding of strengths and limiting beliefs, to achieve desired goals.
5966.D2.9	Understand the art of building effective teams and cultures within the startup space.
Domain	***New Venture Development***
5966.D3.1	Apply problem and customer validation processes.
5966.D3.2	Identify and refine ideas for possible solutions based on research, resources, capabilities, and team.
5966.D3.3	Create a prototype/minimum viable product and test it through customer validation.
5966.D3.4	Communicate problems and solutions effectively, clearly, and concisely to proper audiences.
5966.D3.5	Identify Total Available Market (TAM)
5966.D3.6	Identify Serviceable Available Market (SAM)
5966.D3.7	Identify Serviceable Obtainable Market (SOM)

5966.D3.8	Identify and research competition and identify your value proposition against the competition.
5966.D3.9	Execute plan and launch startup.
Domain	***Business Plan***
5966.D4.1	Understand and build the framework of a business model canvas or business plan depending on the type of business you are starting, and the funding needs you will have.
5966.D4.2	Evaluate market entry strategies like starting a new business, buying an existing business, franchising, and other forms of ownership.
5966.D4.3	Formulate a marketing strategy that connects the product, price, promotion, and location of a new venture.
5966.D4.4	Understand and read the story that numbers can tell us for a business.
5966.D4.5	Understand and calculate unit economics.
5966.D4.6	Create financial statements for your business.
5966.D4.7	Calculate return on investment and break-even points.

Business, Marketing and Entrepreneurship: Special Topics	
Career Cluster	Business Management; Financial Services; Marketing, Sales, & Entrepreneurship
Program of Study	
NLPS Sequence	
Course Code	5968
Course Description	*Business, Marketing, and Entrepreneurship: Special Topics is an extended learning experience designed to address the advancement and specialization of careers within the career cluster through the provision of a specialized course for a specific workforce need in the school's region. The learning experience is at a qualified site, and is designed to give the student the opportunity to learn and practice technical skills; while working under the direction of the appropriately licensed professional. Throughout the course, students will focus on learning about employment opportunities and obtaining the knowledge, skills and attitudes essential for success in specific occupations. Course standards and curriculum must be tailored to the specific profession, preparing students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. Participation in a related CTSO encourages the development of leadership, communication and career related skills, and opportunities for community service.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.

ADDITIONAL COURSE INFO		
Funding	Pilot	
Bulletin 400	● Appropriate Vocational License ● Business Education 7- 12 ● Distributive Education K-12	
Rules 46-47	● Appropriate Vocational license ● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist in related course approved for a CTE pathway	
Rules 2002	● Appropriate CTE License with high school setting ● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist in related course approved for a CTE pathway	
REPA/REPA 3	● Appropriate CTE License 5-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist in related course approved for a CTE Pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	

Advanced Career & Technical Education, College Credit: Business, Marketing, and Entrepreneurship	
Career Cluster	Business Management; Financial Services; Marketing, Sales, & Entrepreneurship
Program of Study	
NLPS Sequence	
Course Code	6142
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited post-secondary institution through an adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint program of study involving a postsecondary partnership.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Appropriate Vocational License ● Business Education 7- 12 ● Distributive Education K-12
Rules 46-47	● Appropriate Vocational license ● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist in related course approved for a CTE pathway
Rules 2002	● Appropriate CTE License with high school setting ● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist in related course approved for a CTE pathway
REPA/REPA 3	● Appropriate CTE License 5-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12

	● Workplace Specialist in related course approved for a CTE Pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Business Management Business Administration							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
4562	Principles of Business Management	7143	Management Fundamentals	4524	Accounting Fundamentals	7256	Business Administration Capstone
		5914	Marketing Fundamentals				

Principles of Business Management		
Career Cluster	Business Management; Financial Services; Marketing, Sales, & Entrepreneurship, Supply Chain & Transportation	
Program of Study	Accounting, Business Administration, Finance and Investment, Insurance, Marketing and Sales, Supply Chain and Logistics	
NLPS Sequence	A	
Course Code	4562	
Course Description	*Principles of Business Management examines business ownership, organization principles and problems, management, control facilities, administration, financial management, and development practices of business enterprises. This course will also emphasize the identification and practice of the appropriate use of technology to communicate and solve business problems and aid in decision making. Attention will be given to developing business communication, problem-solving, and decision-making skills using spreadsheets, word processing, data management, and presentation software.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12	

	● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTEpathway
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 101: Introduction to Business, OTEC 207: Integrated Microsoft Office Applications or OTEC 101: Introduction to Microcomputers
VU Course Alignment	MGMT 100: Introduction to Business, COMP 110: Introduction to Computer Concepts
Four Yr. Course Alignment	BSU – ISOM 125: Introduction to Business Computer Applications ISU - BUS 100: Introduction to Contemporary Business, BUS 180: Business Information Tools IUB - BUS X-100: Introduction to Business IUN/S/K/N - BUS W-100: Introduction to Business IUSB - BUS B-190: Introduction to Business PFW - BUS 10001: Principles of Business Administration PNW - BUSM 10100: Introduction to Business USI - MNGT 201: Survey of Management
Postsecondary Credential	ITCC - CT Business Administration, TC Business Administration (52.0201) VU - A.S. Business Administration (52.0201), A.S. Business Management (52.0101) IUB/K/N/S/SB – B.S. Business (52.0101) PFW – B.S. Business (52.0101) PNW – B.S. in Business (52.1399) BSU – B.S. Business Administration (52.0101) ISU - B.S. in Business Administration, B.S. Finance (52.0101)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 114: Student Success in Business, Humanities/ Social & Behavioral 3-4 hours
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Business***
4562.D1.1	Identify the social, legal, economic, and ethical challenges of the business environment.

4562.D1.2	Identify management and leadership functions, and the relationship to operations and supply chain management.
4562.D1.3	Relate the characteristics of organizational structures to legal forms of business ownership including small business and entrepreneurship.
4562.D1.4	Examine the principles of short- and long-range financial planning, as well as the role of stock exchanges in the financial markets.
4562.D1.5	Analyze business issues and events related to strategic decision-making in an international and global context.
4562.D1.6	Describe the marketing mix/marketing concept and its relationship to purchasing, production, distribution, and quality.
4562.D1.7	Interpret the importance of communication and technology to the success of the organization.
4562.D1.8	List and describe the human resource functions in business.
4562.D1.9	Examine career opportunities in business.
Domain	***Business Software Applications***
4562.D2.1	Explain the purpose of information systems to support organizations and enhance productivity.
4562.D2.2	Explain the physical components and operation of microcomputers.
4562.D2.3	Use word processing, spreadsheet, database, and presentation applications to perform key business tasks.
4562.D2.4	Explain the difference between computer operating systems and user software programs.
4562.D2.5	Identify when to use appropriate features within a software application.
4562.D2.6	Utilize internet applications and “cloud” technologies in business situations.
4562.D2.7	Utilize collaboration technologies.
4562.D2.8	Explain security goals, response to threats, and safeguards.
4562.D2.9	Discuss issues related to the ethical use of information technology.
Domain	***Career Navigation***
4562.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
4562.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
4562.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
4562.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
4562.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
4562.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
4562.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
4562.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***

4562.D5.1	Demonstrate computer literacy skills and basic computer functions.
4562.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
4562.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
4562.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Management Fundamentals		
Career Cluster	Business Management	
Program of Study	Business Administration	
NLPS Sequence	B	
Course Code	7143	
Course Description	*Management Fundamentals describes the functions of managers, including the management of activities and personnel. Describes the judicial system and the nature and sources of law affecting business. Studies contracts, sales contracts with emphasis on Uniform Commercial Code Applications, remedies for breach of contract and tort liabilities. Examines legal aspects of property ownership, structures of business ownership, and agency relationships.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● Business 5-12	

	● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 105: Principles of Management, BUSN 201: Business Law
VU Course Alignment	MGMT 250: Introduction to Management
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Business Administration (52.0201), TC Business Administration (52.0201) VU - A.S. Business Administration (52.0201); A.S. Business Management (52.0101)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 114: Student Success in Business, Humanities/Social & Behavioral 3-4 hours
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Management***
7143.D1.1	Define management, managers, and the basic management functions.
7143.D1.2	Evaluate classical, behavioral, quantitative, and contemporary management theories regarding process, motivation, and expected outcomes. Distinguish between the external, task, and internal environments of organizations.
7143.D1.3	Discuss social responsibility, the meaning of ethics in the business setting, and the social audit.
7143.D1.4	Assess the roles of goals and goal setting in the planning process and identify barriers that may interfere with goal setting.
7143.D1.5	Appraise the strategic planning process and the process of strategy implementation.
7143.D1.6	Structure and support the steps in the decision-making process.
7143.D1.7	Identify and describe the major purposes for and types of forecasting techniques.
7143.D1.8	Discuss the nature of work specialization, departmentalization, and scheduling within the scope of management.
7143.D1.9	Discuss how organizational activities are coordinated and describe the management of organizational conflict.
7143.D1.10	Appraise international business practices and evaluate against cultural and political values.
Domain	***Business Law***
7143.D2.1	Discuss state and federal judicial systems and jurisdictions.
7143.D2.2	Identify the sources of laws as applied to business.
7143.D2.3	Apply appropriate legal principles to contractual obligations.
7143.D2.4	Understand the parameters of the various business structures.

7143.D2.5	Apply the laws of agency and debt adjustment to factual situations.
7143.D2.6	Recognize the obligations and rights of parties to negotiate instruments.
7143.D2.7	Recognize the rights and obligations of parties as regards personal and real property.
7143.D2.8	Recognize the rights and obligations of the parties to sales and lease of goods contracts.
7143.D2.9	Apply the Uniform Commercial Code to sales contracts and differentiate common law and Uniform Commercial Code situations.
7143.D2.10	Understand the application of consumer protection laws.
7143.D2.11	Recognize the importance of both Federal and State employment laws to effective organizational leadership.
7143.D2.12	Understand the importance of protecting intellectual property rights.

Marketing Fundamentals		
Career Cluster	Business Management; Marketing, Sales, & Entrepreneurship	
Program of Study	Business Administration, Marketing and Sales	
NLPS Sequence	B	
Course Code	5914	
Course Description	*Marketing Fundamentals provides a basic introduction to the scope and importance of marketing in the global economy. Course topics include the seven functions of marketing: promotion, channel management, pricing, product/service management, market planning, marketing information management, and professional selling skills. Emphasis is marketing content but will involve use of oral and written communications, mathematical applications, problem-solving, and critical thinking skills through the development of an integrated marketing plan and other projects.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist with specific experience in strategic marketing	

Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist with specific experience in strategic marketing
REPA/REPA 3	● Business 5-12 ● CTE: Marketing 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist with specific experience in strategic marketing
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	MKTG 101: Principles of Marketing, MKTG 102: Principles of Selling
VU Course Alignment	MGMT 280: Introduction to Marketing
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Business Administration (52.0201), TC Business Administration (52.0201), Business Administration, A.S. (52.0201) VU - A.S. Business Administration (52.0201), A.S. Business Management (52.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Marketing***
5914.D1.1	Analyze the nature of marketing in a competitive market, and how it functions in domestic and global economies.
5914.D1.2	Describe the various environmental factors affecting marketing decisions.
5914.D1.3	Explain how mission, situational analysis, objectives, positioning, and product and market analysis affect planning, forecasting and overall marketing strategy.
5914.D1.4	Explain the process of marketing research and its influences on marketing strategy.
5914.D1.5	Apply market segmentation, describe its relationship to selecting a target market, and discuss its effect on the success of the marketing plan.
5914.D1.6	Explain the purchase decision process and influences that affect consumer behavior.
5914.D1.7	Discuss and explain how logistics, marketing channels, and supply chain management create utility.
5914.D1.8	Discuss pricing strategy as it relates to markets, segments, and profitability.
5914.D1.9	Explain the correlation between marketing metrics and customer relationship management in providing feedback to identify gaps in meeting marketing objectives.
5914.D1.10	Construct an integrated marketing plan.
Domain	***Selling***

5914.D2.1	Discuss the relationship between personal selling and the marketing concept/marketing mix.
5914.D2.2	List the characteristics of industrial buying behavior and consumer buying behavior.
5914.D2.3	List or state personal attributes and performance characteristics of successful salespersons.
5914.D2.4	Understand and utilize varieties of communication forms to adapt to the buyer/ seller relationship.
5914.D2.5	Describe the importance of knowledge of the company, the competition, and the product and its impact on selling activities.
5914.D2.6	List the stages of the selling process.
5914.D2.7	Discuss managerial concerns that affect salespersons' performance appraisals.
5914.D2.8	Develop and deliver a prepared tailored presentation.
Domain	***Promotions***
5914.D3.1	Explain the role of promotion as a marketing function
5914.D3.2	Compare and contrast the types of promotion
5914.D3.3	Identify the elements of the promotional mix
5914.D3.4	Describe the use of business ethics in promotion
5914.D3.5	Differentiate types of advertising media, both traditional and digital

Accounting Fundamentals		
Career Cluster	Business Management; Marketing, Sales, & Entrepreneurship	
Program of Study	Business Administration, Accounting, Finance and Investment	
NLPS Sequence	C	
Course Code	4524	
Course Description	*Accounting Fundamentals introduces the language of business using Generally Accepted Accounting Principles (GAAP) and procedures for proprietorships and partnerships using double-entry accounting. Emphasis is placed on accounting principles as they relate to both manual and automated financial systems. This course involves understanding, analyzing, and recording business transactions and preparing, analyzing, and interpreting financial reports as a basis for decision-making.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	

	● Distributive Education K-12
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9- 12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Accounting & Finance 9-12
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Accounting & Finance 9-12 ● CTE: Trade & Industrial: Accounting & Finance 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ACCT 101: Financial Accounting
VU Course Alignment	ACCT 100: Basic College Accounting
Four Yr. Course Alignment	BSU – ACC 201: Principles of Finance and Accounting ISU - BUS 201: Principles of Accounting I PNW - ACC 20000: Introductory Accounting
Postsecondary Credential	ITCC - CT Business Administration (52.0201), TC Business Administration (52.0201); VU - CG Accounting (52.0305) ISU – B.S. Business Administration (52.0101) PNW – B.S. Accounting (52.0301)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 114: Student Success in Business, Humanities/Social & Behavioral 3-4 hours
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Financial Accounting***
4524.D1.1	Recognize the meaning and function of accounting, its importance, and basic US accounting rules and the body most responsible for their development.
4524.D1.2	Use the accounting cycle, including analyzing and recording transactions and preparing basic financial statements in accordance with accrual accounting principles.
4524.D1.3	Account for buying and selling merchandise, including using LIFO, FIFO, and weighted average to assign values to cost of goods sold and ending inventory.

4524.D1.4	Recognize the purpose, advantages, disadvantages, and limitations of internal controls. Prepare a bank reconciliation.
4524.D1.5	Account for uncollectible accounts receivable using the allowance method.
4524.D1.6	Account for notes receivable, including interest accruals.
4524.D1.7	Account for notes payable, including interest accruals. Recognize acceptable accounting for basic payroll and other short-term liabilities.
4524.D1.8	Recognize the cost of a plant asset and use accepted method(s) to depreciate a plant asset. Account for the disposal of a plant asset. Recognize acceptable accounting for other non-current assets.
4524.D1.9	Calculate the present value of bonds at issuance and account for borrowing by issuing bonds.
4524.D1.10	Account for issuing common and preferred stock, treasury stock transactions, and for dividends.
4524.D1.11	Prepare a multi-step income statement and a classified balance sheet. Given cash pieces, prepare a statement of cash flows.
4524.D1.12	Analyze a set of financial statements for profitability and liquidity.

Business Administration Capstone		
Career Cluster	Business Management	
Program of Study	Business Administration	
NLPS Sequence	D	
Course Code	7256	
Course Description	*The Business Administration Capstone course will allow students to explore advanced topics in business leadership including Human Resources and International Business. Additionally students will have the chance to complete Managerial Accounting. Throughout the course students will develop business communication skills through work on projects, labs, and simulations. All of these courses represent key business competencies required by nearly all postsecondary Business schools.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management; Management Fundamentals or Marketing Fundamentals; Accounting Fundamentals	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12	

	● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 202: Human Resource Management; BUSN 207: Introduction to International Business; OTEC 216: Business Communications; ACCT 102: Managerial Accounting
VU Course Alignment	
Four Yr. Course Alignment	BSU – ACC 202: Principles of Managerial Accounting
Postsecondary Credential	ITCC - CT Business Administration (52.0201), TC Business Administration (52.0201) BSU - B.A./B.A. Business Administration (52.0101)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 114: Student Success in Business, Humanities/Social & Behavioral 3-4 hours
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***International Business***
7256.D1.1	Discuss the basic framework of international trade, including importing, exporting comparative advantage, balance of trade and exchange rates.
7256.D1.2	Explain the different ways a purely domestic business can become an international operation.
7256.D1.3	Define multinational enterprise and discuss its impact on the world economy.
7256.D1.4	Discuss how a company's decision-making process in different areas of the world may be affected by the cultures, the political systems, and the economic systems of those areas.
7256.D1.5	Recognize the different trading zones of the world (Pacific Rim, European Community, etc.).
7256.D1.6	Analyze problems encountered in international business negotiations and communications.
Domain	***Business Communications***
7256.D2.1	Utilize critical thinking, decision-making, and problem-solving techniques to promote sound, effective business communications.

7256.D2.2	Analyze audience to determine appropriate language, tone, style, and format for specific communications.
7256.D2.3	Compose routine and specific-purpose business letters including inquiry.
7256.D2.4	Compose memorandums, reports, and telecommunications.
7256.D2.5	Apply accepted rules of grammar, punctuation, capitalization, and spelling when composing and editing documents for accuracy, coherence, continuity, clarity, and format.
7256.D2.6	Appraise and assess interactive listening techniques and nonverbal communications.
7256.D2.7	Evaluate and discuss technical, legal, ethical, and global issues related to business communications.
7256.D2.8	Examine and apply team skills in a classroom environment.
7256.D2.9	Assess and edit written material in a team setting.
7256.D2.10	Summarize material to prepare an effective document.
7256.D2.11	Apply electronic and/or print research skills in assignments and special projects.
7256.D2.12	Utilize computer skills to produce written business communications.
7256.D2.13	Illustrate research findings in a written report using appropriate graphics, charts, and support materials.
7256.D2.14	Utilize social media tools and applications.
Domain	***Managerial Accounting***
7256.D3.1	Discuss the difference between financial and managerial accounting and identify the characteristics, process, organization, and the profession of managerial accounting.
7256.D3.2	Define and discuss the concepts, procedures, and characteristics of a manufacturing process with a job order cost system.
7256.D3.3	Distinguish between the process cost system and the job-order cost system and describe and illustrate a process cost accounting system.
7256.D3.4	Describe the nature and objectives of budgeting, including procedures and various reports.
7256.D3.5	Describe and illustrate methods used for evaluation of capital investment proposals, capital rationing and planning, and controlling capital investment expenditures.
7256.D3.6	Describe and explain the nature and types of decentralization.
7256.D3.7	Define and discuss responsibility accounting for investment centers and transfer pricing.
7256.D3.8	Describe and illustrate inventory control, quantitative techniques for estimating costs, and the learning effect in estimating costs.
7256.D3.9	Define and explain the managerial use of expected value concept, variance analysis using expected value, and maximum concepts of decision-making policies.
7256.D3.10	Define and illustrate the usefulness of financial statement analysis, types of analysis, basic analytical procedures, solving analysis, profitability analysis, and selection of analytical procedures.
7256.D3.11	Describe the nature of concepts of working capital, analysis of cash, and cash flow from operations.
7256.D3.12	Identify and illustrate the characteristics of other selected topics.
Domain	***Human Resources***
7256.D4.1	Define the human resource management functions and how they contribute to achievement of organizational objectives.
7256.D4.2	Discuss how the changing global environment and multicultural society affect human resource management.

7256.D4.3	Examine job analysis methods.
7256.D4.4	Describe the staffing process.
7256.D4.5	Identify the different approaches to performance appraisals.
7256.D4.6	Explain the components of motivation and communication and their effect on the work environment.
7256.D4.7	Analyze the objectives and policies of an organization's total compensation program.
7256.D4.8	Explain the use of audit findings to improve human resource management.
7256.D4.9	Discuss cultural differences as they relate to human resources management.
7256.D4.10	Analyze the legal environment as it relates to human resource management.
7256.D4.11	Identify the different roles that labor unions play in domestic and international business organizations.

Business Management Business Operations and Technology							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7153	Principles of Business Operations and Technology	7144	Business Office Communications	7146	Digital Data Applications	7254	Business Operations and Technology Capstone

Principles of Business Operations and Technology		
Career Cluster	Business Management, Marketing and Finance	
Program of Study	Bus Operations and Technology	
NLPS Sequence	A	
Course Code	7153	
Course Description	*The Principles of Business Operations and Technology course will prepare students to plan, organize, direct, and control the functions and processes of a firm or organization and be successful in a work environment. Students are provided opportunities to develop attitudes and apply skills and knowledge in the areas of business, management, Microsoft office, and finance. Individual experiences will be based upon the student's career and educational goals.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less Than Moderate Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9- 12	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school Setting	
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12	

	● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	OTEC 121: Team Dynamics- Today's Workplace, OTEC 101: Microsoft Outlook
VU Course Alignment	VU - EC - COMP 256: Office Management Communications
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Microsoft Office Specialist (52.0407); TC Business Operations, Applications, and Technology (52.0402) VU/EC - CG Business Office Management Technology (52.0204)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University Transition VU - ENGL 101: English Composition I
Promoted Certifications	MS Outlook
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Microsoft Office***
7153.D1.1	Explore MS Office 2019 and Windows 10.
7153.D1.2	Explore Office 365.
7153.D1.3	Manage email messages.
7153.D1.4	Manage calendars.
7153.D1.5	Manage contacts and personal contact information.
7153.D1.6	Create and manage tasks.
7153.D1.7	Customize Outlook.
7153.D1.8	Recognize special and/or advanced software features as they are related to software certification.
Domain	***Business Operations***
7153.D2.1	Demonstrate professional etiquette.
7153.D2.2	Examine teamwork and teambuilding skills in a diverse environment.
7153.D2.3	Describe the steps necessary to plan meetings, make conference and travel arrangements, and schedule appointments.
7153.D2.4	Apply personal and business time and stress management techniques.
7153.D2.5	Apply best practices for managing confidential information.
7153.D2.6	Identify personal and professional characteristics associated with job success.
7153.D2.7	Examine the need for and demonstrate the ability to engage in lifelong learning.
7153.D2.8	Demonstrate the appropriate soft skills in a diverse workplace.
7153.D2.9	Collect and compile data to prepare resume and letter of application.
7153.D2.10	Analyze situations involving confidentiality and ethical behavior.

7153.D2.11	Prepare and manage internal and external workplace communication.
7153.D2.12	Analyze, research, and summarize data and incorporate it into a presentation.
7153.D2.13	Evaluate the physical components of an office and their effect on efficiency.
7153.D2.14	Apply standard ARMA alphabetic indexing rules to business documents.
7153.D2.15	Demonstrate the ability to manage records.
Domain	***Career Navigation***
7153.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7153.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7153.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7153.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7153.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7153.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7153.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7153.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7153.D5.1	Demonstrate computer literacy skills and basic computer functions.
7153.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7153.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7153.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Business Office Communications	
Career Cluster	Business Management, Marketing and Finance
Program of Study	Bus Operations and Tech
NLPS Sequence	B
Course Code	7144
Course Description	*The Business Office Communications course emphasizes the analysis of communication to direct the choice of oral and written methods and techniques. It includes practice in writing a variety of messages used to communicate in business and industry with an emphasis on the potential impact of the message on the receiver as a basis for planning and delivering*

	effective business communications. Through projects and the development of messages students will develop their knowledge and skills for the use of Microsoft Word and Microsoft PowerPoint.
Prerequisite(s)/ Corequisite(s)	Principles of Business Operations and Technology
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	Less than Moderate Value | Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9- 12
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school Setting
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	OTEC 216: Business Communications, OTEC 105: Microsoft Word, OTEC 109: Microsoft PowerPoint
VU Course Alignment	VU-EC - COMP 202: Business Documents and Presentations
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Microsoft Office Specialist (52.0407); TC Business Operations, Applications, and Technology (52.0402) VU/EC - CG Business Office Management Technology (52.0204)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University Transition VU - ENGL 101 English Composition I
Promoted Certifications	MS Word, MS PowerPoint

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Business Communications***
7144.D1.1	Utilize critical thinking, decision-making, and problem-solving techniques to promote sound, effective business communications.
7144.D1.2	Analyze audience to determine appropriate language, tone, style, and format for specific communications.
7144.D1.3	Compose routine and specific-purpose business letters including inquiry.
7144.D1.4	Compose memorandums, reports, and telecommunications.
7144.D1.5	Apply accepted rules of grammar, punctuation, capitalization, and spelling when composing and editing documents for accuracy, coherence, continuity, clarity, and format.
7144.D1.6	Appraise and assess interactive listening techniques and nonverbal communications.
7144.D1.7	Evaluate and discuss technical, legal, ethical, and global issues related to business communications.
7144.D1.8	Examine and apply team skills in a classroom environment.
7144.D1.9	Assess and edit written material in a team setting.
7144.D1.10	Summarize material to prepare an effective document.
7144.D1.11	Apply electronic and/or print research skills in assignments and special projects.
7144.D1.12	Utilize computer skills to produce written business communications.
7144.D1.13	Illustrate research findings in a written report using appropriate graphics, charts, and support materials.
7144.D1.14	Utilize social media tools and applications.
Domain	***MS Word***
7144.D2.1	Navigate the Windows operating software environment.
7144.D2.2	Create, edit, save, and print a document.
7144.D2.3	Customize options and views for documents.
7144.D2.4	Determine and set appropriate character and paragraph formatting.
7144.D2.5	Use Windows and Office Clipboards.
7144.D2.6	Configure suitable page layout options.
7144.D2.7	Generate, format, and manipulate tables and lists.
7144.D2.8	Modify and insert graphic elements in a document and apply effects.
7144.D2.9	Apply references such as captions, citations, headers, footers, and endnotes.
7144.D2.10	Analyze documents to share and maintain.
7144.D2.11	Create, insert, and update table of contents, index, and table of figures.
7144.D2.12	Use the Find and Replace feature.
7144.D2.13	Customize themes and styles.
7144.D2.14	Perform mail merge.
7144.D2.15	Proof and correct business documents using appropriate review tools.
7144.D2.16	Proof and validate documents.
7144.D2.17	Insert and use field codes and Quick Parts.
7144.D2.18	Devise simple macros and manage macro security.
Domain	***MS PowerPoint***

7144.D3.1	Utilize PowerPoint software to plan, create, evaluate, and deliver professional presentations to a diverse audience.
7144.D3.2	Format graphics and apply transitions and animations.
7144.D3.3	Apply advanced formatting to objects on a slide.
7144.D3.4	Customize and enhance PowerPoint Presentations using advanced animations.
7144.D3.5	Inspect, package, and distribute a presentation.
7144.D3.6	Integrate other software applications in presentations.
7144.D3.7	Customize PowerPoint Presentations and the PowerPoint Environment.
7144.D3.8	Create Photo Album.

Digital Data Applications		
Career Cluster	Business Management, Marketing and Finance	
Program of Study	Bus Operations and Tech	
NLPS Sequence	C	
Course Code	7146	
Course Description	*Students will use Microsoft Excel to sort and search records, combine files, produce reports, and to extract data from a file. This course is designed to include creating and formatting worksheets, using formulas and basic functions, creating charts, and printing professional-looking reports. Additionally students will use Microsoft Access to create a database and to manage a database through the creation and modification of a query. Students will also be expected to produce reports from the information.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Operations and Technology	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9- 12	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting	

	● CTE: Business Services & Technology with high school Setting
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	OTEC 218: Microsoft Excel, OTEC 222: Microsoft Access
VU Course Alignment	COMP 185: Introduction to Databases VU-EC - COMP 234: Data Management with Spreadsheets
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Microsoft Office Specialist (52.0407); TC Business Operations, Applications, and Technology (52.0402) VU/EC - CG Business Office Management Technology (52.0204)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University Transition VU - ENGL 100: English Composition I
Promoted Certifications	MS Excel, MS Access
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***MS Excel***
7146.D1.1	Create worksheets and workbooks.
7146.D1.2	Navigate through worksheets and workbooks.
7146.D1.3	Format worksheets and workbooks.
7146.D1.4	Customize options and views for worksheets and workbooks.
7146.D1.5	Configure worksheets and workbooks to print or save.
7146.D1.6	Insert data in cells and ranges.
7146.D1.7	Format cells and ranges.
7146.D1.8	Order and group cells and ranges.
7146.D1.9	Create a table.
7146.D1.10	Modify a table.
7146.D1.11	Filter and sort a table.
7146.D1.12	Utilize cell ranges and references in formulas and functions.
7146.D1.13	Summarize data with functions.
7146.D1.14	Utilize conditional logic in functions.
7146.D1.15	Format and modify text with functions.
7146.D1.16	Create a chart.
7146.D1.17	Format a chart.
7146.D1.18	Insert and format an object.

7146.D1.19	Recognize special and/or advanced software features as they relate to software certifications.
Domain	***MS Access***
7146.D2.1	Create, open, close, and exit a database.
7146.D2.2	Identify objects in the navigation pane.
7146.D2.3	Demonstrate the ability to build tables using standard database guidelines.
7146.D2.4	Create and edit relationships among tables.
7146.D2.5	Utilize and refine query tools.
7146.D2.6	Maintain, sort, and filter data.
7146.D2.7	Create forms using Form Wizard and other design tools.
7146.D2.8	Define criteria for record selection.
7146.D2.9	Create, modify, and customize tables, forms, and reports.
7146.D2.10	Integrate and analyze data by importing, exporting, and linking.
7146.D2.11	Demonstrate the ability to apply application parts using blank forms, quick start and templates.
7146.D2.12	Automate tasks using macros.
7146.D2.13	Manage and secure the database.

Business Operations and Technology Capstone		
Career Cluster	Business Management, Marketing and Finance	
Program of Study	Bus Operations and Tech	
NLPS Sequence	D	
Course Code	7254	
Course Description	*Digital literacy has become increasingly important to the business environment. Technological advances provide opportunities for businesses to survey inclusion of new innovations. This course discusses, identifies, researches, and applies emerging technologies. Discussing new technology and understanding the importance of updating skills is necessary for today's business operations.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Operations and Technology; Business Office Communications; Digital Data Applications	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	

Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9- 12
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school Setting
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	OTEC 201: Emerging Technologies, OTEC 213: Google Technologies, OTEC 214: Microsoft Project, OTEC 228: Advanced Microsoft Excel
VU Course Alignment	ACCT 291: Accounting with QuickBooks, COMP 107: Web Page Design VU-EC – CNET 151: Information and Data Security I; COMP 242: Creating a Personal Brand and e-Portfolio; ECON 208: Personal Financial Management
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Microsoft Office Specialist (52.0407); TC Business Operations, Applications, and Technology (52.0402) VU/EC - CG Business Office Management Technology (52.0204)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University Transition VU - ENGL 101: English Composition
Promoted Certifications	MS Project

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Emerging Technologies***
7254.D1.1	Discuss digital literacy in the increasingly complex business environment.
7254.D1.2	Demonstrate a comprehensive understanding of the Internet including ethical and security issues.
7254.D1.3	Demonstrate basic knowledge of emerging technologies to include terms, concepts, and trends.
7254.D1.4	Design, produce, publish, and maintain documents utilizing emerging technology.
7254.D1.5	Recognize the types of online communication and demonstrate how business operations utilize the Internet for communication.
7254.D1.6	Identify the convergence of computing and mobile communications.
7254.D1.7	Assemble original work for inclusion in LinkedIn portfolio.
7254.D1.8	Integrate work-based learning experience in an office environment.

Domain	Project Management (MS Project)
7254.D2.1	Set up project information.
7254.D2.2	Create and modify a project task structure.
7254.D2.3	Prepare a logical schedule model.
7254.D2.4	Construct a user-controlled schedule.
7254.D2.5	Analyze and modify multiple projects.
7254.D2.6	Apply and change resource information.
7254.D2.7	Create and edit resource assignments.
7254.D2.8	Analyze and modify resource allocations.
7254.D2.9	Predict project costs.
7254.D2.10	Set up and maintain baselines.
7254.D2.11	Summarize and synthesize actual progress.
7254.D2.12	Compare progress against a baseline.
7254.D2.13	Change potential schedule problems.
7254.D2.14	Show critical path information.
7254.D2.15	Apply and customize views.
7254.D2.16	Manipulate data with other applications.
7254.D2.17	Design and prepare display reports and dashboards

Construction

Introduction to Construction		
Career Cluster	Construction	
Program of Study		
NLPS Sequence	Introductory Course	
Course Code	4792	
Course Description	*Introduction to Construction is a course that will offer hands-on activities and real-world experiences related to the skills essential in residential, commercial and civil building construction. During the course students will be introduced to the history and traditions of construction trades. The student will also learn and apply knowledge of the care and safe use of hand and power tools as related to each trade. In addition, students are introduced to blueprint reading, applied math, basic tools and equipment, and safety. Students will demonstrate building construction techniques, including concrete and masonry, framing, electrical, plumbing, dry walling, HVAC, and painting as developed locally in accordance with available space and technologies. Students learn how architectural ideas are converted into projects and how projects are managed during a construction project in this course. Students study construction technology topics such as preparing a site, doing earthwork, setting footings and foundations, building the superstructure, enclosing the structure, installing systems, finishing the structure, and completing the site. Students also investigate topics related to the purchasing and maintenance of structures, special purpose facilities, green construction and construction careers.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes	**Note**: This course qualifies for funding at the 8th grade level	
ADDITIONAL COURSE INFO		
Funding	Introductory	Available for 8th grade
Bulletin 400	● Industrial Arts 7-12, K12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist: Building Trades	

	● Workplace Specialist in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist: Building Trades 9-12 ● Workplace Specialist in related course approved for a CTE pathway ● Workplace Specialist: Construction 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
4792.D1.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
4792.D1.2	Explain the benefits and responsibilities of being a member of a CTSO.
4792.D1.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
4792.D1.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
4792.D2.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
4792.D2.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster.
4792.D2.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
4792.D2.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society.
4792.D2.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest.
4792.D2.6	Distinguish differences among careers within the career cluster and identify trends related to

	at least five careers/pathways.
4792.D2.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster.
Domain	***Safety and Tool Use***
4792.D3.1	Students incorporate construction site and tool safety to maintain a safe worksite.
4792.D3.2	Comply with all applicable Occupational Safety and Health Administration (OSHA) rules and regulations
4792.D3.3	Identify and locate the Material Safety Data Sheets (MSDS) and follow the procedures as necessary
4792.D3.4	Identify and use safety equipment while in a construction environment
4792.D3.5	Demonstrate knowledge of rules and regulations regarding the safe use of hand and power tools
4792.D3.6	Demonstrate knowledge of the care and maintenance of hand and power tools.
4792.D3.7	Choose the appropriate tool to use in different construction tasks.
4792.D3.8	Identify and interpret health, safety, and welfare standards as dictated by local, state, or federal agencies, in relation to shop/work site safety
Domain	***Introduction to Construction***
4792.D4.1	Students appraise the development of different areas construction for background knowledge.
4792.D4.2	Identify and describe the different structure types
4792.D4.3	Explain the history of carpentry, masonry, plumbing, and electrical
4792.D4.4	Demonstrate an understanding of the relationship between construction and the environment
4792.D4.5	Describe the development of construction technology, its impact on the built environment and the impact of growth on the construction industry
4792.D4.6	Describe the benefits of the construction industry on health and safety, communication, transportation, and the economy
4792.D4.7	Evaluate the importance of community planning
4792.D4.8	Identify and describe the elements of planning a community and procedures necessary to change/maintain the infrastructure of a community
Domain	***Blueprint Reading and Drawing***
4792.D5.1	Students interpret and develop working drawings for construction projects.
4792.D5.2	Evaluate a structure e and determine if it would be considered residential/light, commercial, or Industrial/Civil based on its features
4792.D5.3	Identify the components of various kinds of structures foundations, Interior walls, Exterior walls, Roofs, Flooring systems
4792.D5.4	Compare different types of drawings used by architects and engineers in a set of working drawings
4792.D5.5	Recognize and identify basic blueprint terms, components, and symbols
4792.D5.6	Interpret and use drawing dimensions

4792.D5.7	Create a set of basic drawings for a structure
Domain	***Math in Construction***
4792.D6.1	Students integrate appropriate mathematical skills to solve job-related problems in construction.
4792.D6.2	Solve job-related problems by adding, subtracting, multiplying, and dividing numbers, using fractions, decimals, and whole numbers
4792.D6.3	Demonstrate the ability to estimate materials required for construction project
4792.D6.4	Solve job-related problems, using handbooks, charts, and tables
4792.D6.5	Utilize estimation techniques to formulate a bid for a construction job
4792.D6.6	Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders
4792.D6.7	Convert measurements from the English to the metric system and from the metric to the English system
4792.D6.8	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet, and inches
4792.D6.9	Determine ratios and proportions
4792.D6.10	Read a ruler and a tape measure
4792.D6.11	Change hours and minutes to decimals, fractions, and mixed numbers
4792.D6.12	Use geometry concepts to calculate truss designs
Domain	***Construction Business***
4792.D7.1	Students assess management processes to understand construction business and finance for a project.
4792.D7.2	Model the organizational chart of a typical construction company
4792.D7.3	Classify the steps in the bidding process
4792.D7.4	Examine the finance process for different construction projects
4792.D7.5	Identify the components of a construction contract
4792.D7.6	Identify financial responsibilities of a construction company
4792.D7.7	List and describe the procedures for initiating a building project
Domain	***Specifications and Codes***
4792.D8.1	Students interpret and apply specification and code information from a variety of architectural and construction working drawings.
4792.D8.2	Demonstrate knowledge of reading and interpreting plans, elevations, schedules, sections, and details contained in basic construction drawings as related to site layout, floors and walls
4792.D8.3	Demonstrate the ability to estimate materials for use in site layout, floors and walls
4792.D8.4	Describe the process of applying for building permits and variances
4792.D8.5	Demonstrate an understanding of zoning requirements
4792.D8.6	Demonstrate appropriate selection, handling, storage, and proper use of construction materials
4792.D8.7	Evaluate different material types and their applications to choose appropriate materials for

	the job
4792.D8.8	Identify and describe specifications in a set of working drawings
4792.D8.9	Compare zoning and building codes in different parts of the country
4792.D8.10	Identify the process needed to obtain a building permit
4792.D8.11	Show the management of a construction project
Domain	***The Site***
4792.D9.1	Students apply and adapt concepts related to job site preparation and project layout.
4792.D9.2	Determine zoning requirements for different projects in different locations
4792.D9.3	Demonstrate layout procedures of a site as determined by working drawings
4792.D9.4	Layout and mark building location and elevation using survey equipment
4792.D9.5	Compare building codes for different sites and for different structures
4792.D9.6	Outline the excavation of a site
4792.D9.7	Assess the process of cleaning and maintaining the site
4792.D9.8	Determine earthwork needed for different construction projects
Domain	***Foundations***
4792.D10.1	Students apply and adapt foundation building techniques for construction projects.
4792.D10.2	Students evaluate quantities and strength of concrete and masonry materials
4792.D10.3	Determine boundary lines for a project's foundation
4792.D10.4	Choose the appropriate foundation for the construction project
4792.D10.5	Select the footings needed for a structure
4792.D10.6	Critique different methods for building foundations
4792.D10.7	Demonstrate foundation building techniques
Domain	***Floor and Wall Framing***
4792.D11.1	Students determine the processes and sequencing to floor and wall framing that meet minimum local, state, or federal industry standards.
4792.D11.2	Apply and adapt concept knowledge of building structure, materials, detail structural members, and methods of construction
4792.D11.3	Choose appropriate floor and wall construction methods for the project
4792.D11.4	Demonstrate the process of floor framing construction on a foundation
4792.D11.5	Use the correct types of fastening methods for attaching framing members
4792.D11.6	Identify and describe the loads on a floor frame
4792.D11.7	Illustrate the method of applying floor sheathing
4792.D11.8	Analyze methods for framing walls for different structures in accordance to safety codes
4792.D11.9	Examine the ability of framing members in a wall to carry loads and transfer to the foundation
4792.D11.10	Demonstrate the process for layout and assembly of wall framing
4792.D11.11	Summarize the proper methods to erect0 and attach walls
Domain	***Roof Framing and Finishing***

4792.D12.1	Students identify and adapt concepts of roofing layout, slopes, pitches, materials estimation, used in residential home construction.
4792.D12.2	Differentiate between roof types based on their aesthetics, use, and framing
4792.D12.3	Apply and adapt concept procedures for installation of roof sheathing systems
4792.D12.4	Identify concepts of engineered roofing materials
4792.D12.5	Implement correct procedures for use of framing square, quick square, and rafter tables
4792.D12.6	Identify and explain different types of roofing systems and applications
4792.D12.7	Describe the general process that is used to install roof trusses
4792.D12.8	Apply and adapt concepts for roof venting, and flashing materials, and installations
4792.D12.9	Calculate, layout, and build basic roof rafters and trusses to be installed
4792.D12.10	Identify and describe the parts of a roof system
4792.D12.11	Describe the balance of forces that a roof truss is engineered to withstand and the precautions that need to be taken to preserve their structural integrity
Domain	***Mechanical Systems***
4792.D13.1	Students create simple electrical, plumbing, and HVAC system found in standard residential construction
4792.D13.2	Describe the three phases of a plumbing project: underground rough-in, above ground rough-in, and finish
4792.D13.3	Describe the advantages and disadvantages of various pipe materials used in plumbing systems
4792.D13.4	Demonstrate a basic understanding of plumbing systems in a structure
4792.D13.5	Identify and describe the electrical systems in a structure
4792.D13.6	Demonstrate basic electrical rough-in and installation of common outlets, conduits, and boxes in accordance with national and local codes
4792.D13.7	Identify and explain the characteristics, uses, and installation techniques for brick pavers
4792.D13.8	Adapt and apply masonry skills related to a construction project
4792.D13.9	Analyze the observable changes in masonry products due to weather, ratios of materials, and location
Domain	***Interior and Exterior Finishes***
4792.D14.1	Students apply and adapt finishing techniques for Interior and exterior systems according to codes and specifications.
4792.D14.2	Distinguish between common interior wall materials and the finishes applied
4792.D14.3	Apply and adapt installation procedures and materials for selection of wood and non- wood products
4792.D14.4	Identify and adapt interior door types and styles, installation procedures, and finish techniques
4792.D14.5	Identify and apply concepts for the installation of exterior doors, windows, and siding
4792.D14.6	Identify and adapt concepts and procedures for installing different types of trim used in exterior and interior finish systems

Architecture and Construction: Special Topics	
Career Cluster	Construction
Program of Study	
NLPS Sequence	
Course Code	5654
Course Description	*Architecture and Construction: Special Topics is an extended learning experience designed to address the advancement and specialization of careers within the career cluster through the provision of a specialized course for a specific workforce need in the school's region. The learning experience is at a qualified site, and is designed to give the student the opportunity to learn and practice technical skills; while working under the direction of the appropriately licensed professional. Throughout the course, students will focus on learning about employment opportunities and obtaining the knowledge, skills and attitudes essential for success in specific occupations. Course standards and curriculum must be tailored to the specific profession, preparing students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. Participation in a related CTSO encourages the development of leadership, communication and career related skills, and opportunities for community service.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12 ● Appropriate Vocational License
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: CivilArchitectural Engineering 9- 12 ● Occupational Specialist I, II or III: Civil-Architectural Engineering 9-12 ● Occupational Specialist I, II or III: Building Trades Technology 9-12 ● Appropriate Vocational License ● Occupational Specialist in related course approved for a CTE pathway
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Civil-Architectural Engineering Workplace Specialist: Civil Architectural Engineering

	● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Appropriate CTE License with high school setting ● Workplace Specialist in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial CivilArchitectural Engineering 5-12 ● Workplace Specialist: Engineering 9- 12 ● Workplace Specialist: Construction 9- 12 ● Workplace Specialist: Building Trades 9-12 ● Appropriate CTE License 5-12 ● Workplace Specialist in related course approved for a CTE Pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Advanced Career & Technical Education, College Credit: Architecture and Construction	
Career Cluster	Construction
Program of Study	
NLPS Sequence	
Course Code	6132
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited post-secondary institution through an adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint*

	program of study involving a postsecondary partnership.
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12 ● Appropriate Vocational License
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: CivilArchitectural Engineering 9- 12 ● Occupational Specialist I, II or III: Civil-Architectural Engineering 9-12 ● Occupational Specialist I, II or III: Building Trades Technology 9-12 ● Appropriate Vocational License ● Occupational Specialist in related course approved for a CTE pathwa
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Civil-Architectural Engineering Workplace Specialist: CivilArchitectural Engineering ● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Appropriate CTE License with high school setting ● Workplace Specialist in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial CivilArchitectural Engineering 5-12 ● Workplace Specialist: Engineering 9- 12 ● Workplace Specialist: Construction 9- 12 ● Workplace Specialist: Building Trades 9-12 ● Appropriate CTE License 5-12 ● Workplace Specialist in related course approved for a CTE Pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	

Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
	Competencies dependent on enrolled postsecondary coursework.

Construction Building and Facilities Maintenance							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7130	Principles of Construction Trades	7285	Building and Facilities Maintenance Fundamentals	7286	Advanced Building and Facilities Maintenance	7287	Building and Facilities Maintenance Capstone

Principles of Construction Trades		
Career Cluster	Construction	
Program of Study	Building and Facilities Management, Civil Construction (Heavy Highway), Construction Trades – Carpentry, Construction Trades – Electrical, Heavy Equipment Operations	
NLPS Sequence	A	
Course Code	7130	
Course Description	*Principles of Construction Trades prepares students with the basic skills needed to continue in a construction trade field. Topics will include an introduction to the types and uses for common hand and power tools, learn the types and basic terminology associated with construction drawings, and basic safety. Additionally, students will study the roles of individuals and companies within the construction industry and reinforce mathematical and communication skills necessary to be successful in the construction field.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	

Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12
Rules 2002	●Technology Education with high school setting ● Workplace Specialist: Building Trades ● Workplace Specialist in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade and Industrial: Building Trades 5-12 ● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Workplace Specialist in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BCTI 100: Introduction to Construction Technology
VU Course Alignment	CNST 100: Construction Seminar, CNST 120: Construction Safety
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Carpentry Specialist (46.0415), TC Carpentry Specialist (46.0415) VU - CG Construction Carpenter Assistant (46.0000)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; COMM 104: Workplace Communications, IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, MATH 100+ level or higher
Promoted Certifications	NCCER Core Certification
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Construction Trades***
7130.D1.1	Comply with OSHA-10 training requirements. Explain the safety obligations of workers, supervisors, and managers to ensure a safe workplace.
7130.D1.2	Review basic mathematical functions and explain their applications to the construction trades.
7130.D1.3	Identify and explain specific applications of hand tools that are widely used in the construction industry, such as hammers, saws, levels, pullers, and clamps.
7130.D1.4	Provide detailed descriptions of commonly used power tools, such as drills, saws, grinders, and sanders. Review applications, proper use, safety, and maintenance. Demonstrate power tool use in on-the-job settings.

7130.D1.5	Discuss basic terms for construction drawings, components, and symbols. Explain the different types of drawings and interpret and use drawing dimensions.
7130.D1.6	Explain how ropes, chains, hoists, loaders, and cranes are used to move material and equipment from one location to another on a job site.
7130.D1.7	Identify the roles of individuals and companies in the construction industry.
7130.D1.8	Recognize hazards associated with materials handling and explain proper materials handling techniques and procedures.
Domain	***Construction Industry***
7130.D2.1	Recognize direct job opportunities in the - construction field.
7130.D2.2	Recognize indirect job opportunities in the -construction field.
7130.D2.3	Become familiar with new residential building products.
7130.D2.4	Understand the connection between residential construction and related fields.
7130.D2.5	Understand the importance of safety training and education in the construction industry.
7130.D2.6	Understand the relationship between worker's compensation insurance and safety record.
7130.D2.7	Understand and appreciate the roles that OSHA and INSafe play in the construction industry.
7130.D2.8	Understand the hazards involved in the residential construction industry.
7130.D2.9	Understand basic drafting/drawing techniques and how to apply them to - working drawings.
7130.D2.10	Understand the relationship between individual building components and a structure as a whole.
7130.D2.11	Utilize different resources to understand building component's applications and their limitations.
7130.D2.12	Understand basic print reading for the construction industry.
Domain	***Career Navigation***
7130.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7130.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7130.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7130.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7130.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.

7130.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7130.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7130.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7130.D5.1	Demonstrate computer literacy skills and basic computer functions.
7130.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7130.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7130.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Building and Facilities Maintenance Fundamentals		
Career Cluster	Construction	
Program of Study	Building and Facilities Maintenance	
NLPS Sequence	B	
Course Code	7285	
Course Description	*Building and Facilities Maintenance Fundamentals prepares students to complete basic maintenance tasks like minor construction repairs and be able to repair and/or replace various building materials including flooring, wall covering, hardware, lighting, and plumbing fixtures.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Maintenance K-12	

Rules 46-47	● Standard Trade & Industrial: Building Maintenance 9-12 ● Occupational Specialist I, II or III: Building Maintenance 9-12
Rules 2002	● CTE: Trade & Industrial: Building Facilities & Maintenance ● Workplace Specialist: Building Facilities & Maintenance
REPA/REPA 3	● CTE: Trade & Industrial Building Maintenance 5-12 ● Workplace Specialist: Facilities Management & Maintenance 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HVAC 120: Building and Property Maintenance I
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	Certificate for Apartment Maintenance Technicians CAMT
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Safety***
7285.D1.1	Know and understand applicable local, state, and federal statutes and regulations
7285.D1.2	Demonstrate proper use and storing of chemicals safely and in accordance with manufacturer's recommendations
7285.D1.3	Demonstrate proper use and care for personal protective equipment (PPE)
7285.D1.4	Know and demonstrate proper safety practices for working with electricity including shutting down utility and power sources
Domain	***Painting***
7285.D2.1	Commonly used personal protective equipment (PPE - gloves, eye protection, respirator)
7285.D2.2	Safety regulations overview regarding lead, mold, and asbestos (information only, not a certification program)
7285.D2.3	Proper preparation techniques, including wall texture, dust removal, priming and painting
7285.D2.4	Texturing methods including smooth, orange peel, knock down, stipple, and popcorn

7285.D2.5	Paint types, including differences between interior and exterior paints as well as sheen and gloss types (flat, satin, semi-gloss, gloss)
7285.D2.6	Identify, define, and demonstrate basic painting techniques including cutting in and coverage techniques using both brush and roller
7285.D2.7	Repairing damaged areas and matching textures
7285.D2.8	Estimate the cost of painting a room
7285.D2.9	Understand the differences between painting and staining and appropriate usage of each
7285.D2.10	Understand and demonstrate the proper surface preparation and proper staining techniques
Domain	***Construction Repairs***
7285.D3.1	Commonly used safety equipment, including equipment for lock-out tag-out and personal protective equipment (PPE - gloves, eye protection)
7285.D3.2	Caulking (latex, silicone)
7285.D3.3	Backing materials, including drywall, tile backer (durock, hardibacker, green board etc.), and caulking rod
7285.D3.4	Drywall patching techniques, including paper tape, mesh tapes, adhesive patch (metal), and scab patches
7285.D3.5	Mudding techniques (skimming, finishing), tools, and materials (joint compound and spackle)
7285.D3.6	Performing common drywall repairs including dent/gouge repair, nail pop secure and repair, doorknob/fist hole repair, and larger (stud to stud) repair
7285.D3.7	Identify and demonstrate proper techniques for measuring, cutting, installing, and finishing trims.
7285.D3.8	Identify tiling terminology and different types of tiles used in and around residential and commercial buildings
7285.D3.9	Identify various tools used for tiling and demonstrate their proper procedures for using tiling tools
7285.D3.10	Perform common tile repairs including grout and install tile (floor and wall)
7285.D3.11	Define flooring terminology and different types of flooring.
7285.D3.12	Identify various tools used for flooring and demonstrate the proper procedures for using
7285.D3.13	Perform common flooring installation, repair, and care techniques.
Domain	***Security***
7285.D4.1	Parts identification and usage, including deadbolt, entry knob, passage knob, privacy knob and lock, and amenity/stockroom knob
7285.D4.2	Investigate key security access features (coded keys, records, locking standards for key box and key access)
7285.D4.3	Identify different types of doors and perform common door frame repair techniques

7285.D4.4	Install common doorknobs and locks
Domain	***Exterior Maintenance and Repair***
7285.D5.1	Inspection protocols, including slip, trip and fall, lighting, liability, landscaping, parking lot and property
7285.D5.2	Students will investigate and demonstrate basic landscaping maintenance tasks such as mowing, mulching, turf management, and planting trees, shrubs, and flowers.
7285.D5.3	Identify various types of windows and common repairs.
7285.D5.4	Identify common roofing materials, tools, and perform minor repairs
7285.D5.5	Identify common siding materials, tools, and perform minor repairs
7285.D5.6	Identify common masonry projects, materials, tools, and perform minor repairs
Domain	***Building and Property Maintenance***
7285.D5.1	List the different types of records that need to be kept on a maintenance operation.
7285.D5.2	Create a preventive maintenance plan for various types of equipment.
7285.D5.3	Analyze problems with major appliances.
7285.D5.4	Explain differences in installation of major appliances.
7285.D5.5	Describe requirements for chemical usage and storage.
7285.D5.6	Summarize basic ADA requirements for multi-family dwellings and public buildings.
7285.D5.7	List safety and liability issues related to rental property.
7285.D5.8	Identify processes and procedures necessary for water chemical analysis.
7285.D5.9	Demonstrate a working knowledge of building controls, smart thermostat, and entry systems.
7285.D5.10	Troubleshoot and maintain fluid power systems.
7285.D5.11	Analyze and determine methods for proper groundskeeping.

Advanced Building and Facilities Maintenance	
Career Cluster	Construction
Program of Study	Building and Facilities Maintenance
NLPS Sequence	C
Course Code	7286
Course Description	*Advanced Building and Facilities Maintenance prepares students to complete more advanced repairs involving a building's mechanical system including electrical, HVAC, and plumbing.*

Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Building and Facilities Maintenance Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Maintenance K-12	
Rules 46-47	● Standard Trade & Industrial: Building Maintenance 9-12 ● Occupational Specialist I, II or III: Building Maintenance 9-12	
Rules 2002	● CTE: Trade & Industrial: Building Facilities & Maintenance ● Workplace Specialist: Building Facilities & Maintenance	
REPA/REPA 3	● CTE: Trade & Industrial Building Maintenance 5-12 ● Workplace Specialist: Facilities Management & Maintenance 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HVAC 122: Building and Property Maintenance II	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications	Certificate for Apartment Maintenance Technicians CAMT	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Electricity***	
7286.D1.1	Understand and apply Ohm's Law (Watt's law) and common terms	
7286.D1.2	Common electrical principals and usage of common devices	
7286.D1.3	Introduction to schematics and commonly used symbols	
7286.D1.4	Usage of lock-out tag-out and personal protective equipment	
7286.D1.5	Fixture use and operation of incandescent, fluorescent, and LED lights	
7286.D1.6	Applicable National Electrical Code Regulations	

7286.D1.7	Using meter to measure Volts, Amps, Ohm's and Continuity
7286.D1.8	Diagnosing and troubleshooting residential circuits including outlet (switched and direct), switch (single and three way), ground fault circuit interrupter (GFCI), and common safety devices (e.g., smoke detector, CO detector)
7286.D1.9	Performing proper electrical connections and repairs per National Electric Code (NEC) including terminal connections, lugs, wire to wire (wire nuts), and covered boxes
Domain	***Plumbing***
7286.D2.1	Plumbing construction, including supply side common connections and repair techniques, drain side common connection and repair techniques, and venting issues
7286.D2.2	Proper use of tools, including the toilet plunger (Sink and toilet), snake and auger (hand crank; not powered)
7286.D2.3	Common fixture repairs and replacements, including toilet, faucet, sink, tub drain, and overflow
7286.D2.4	Proper installation of caulking and plumbing chemicals including caulk, plumber's grease, thread seal, and plumber's putty
7286.D2.5	Repairing common pipe leaks using the appropriate fitting (threaded, barbed (e.g., shark bite), compression, flare, solvent weld (glue and primer), solder)
7286.D2.6	Clearing drains without the use of chemical drain opener
7286.D2.7	Diagnosing and repairing all toilet components from flange repair up, including wax ring and bolts, toilet bowl, tank, fill valve, and flush valve
7286.D2.8	Diagnosing and replacing fixtures from the supply line in, including angle stop and supply line, faucet leak at counter, faucet underbody, faucet control (valve control adjust and replace), and aerator.
Domain	***Mechanical***
7286.D3.1	Commonly used safety equipment, including equipment for lock-out tag-out and personal protective equipment (PPE) (gloves, eye protection)
7286.D3.2	Preventative maintenance techniques for HVAC systems (filter, motor lubrication, coil cleaning) and water heaters (flush and fill)
7286.D3.3	Correcting common service issues including clogged filters and clogged/obstructed coils (Evap and Condenser).
7286.D3.4	Circulation pumps
Domain	***Appliance Repair***
7286.D4.1	Commonly used safety equipment, including equipment for lock-out tag-out and personal protective equipment (PPE) (gloves, eye protection, insulated tools) 010701
7286.D4.2	Proper operation of refrigerator, dishwasher, garbage disposal, gas range (oven and cooktop), electric range (oven and cooktop), clothes washer (top loading), clothes dryer (electric only)
7286.D4.3	Common service requests for refrigerator, dishwasher, garbage disposal, gas range (oven and cooktop), electric range (oven and cooktop), clothes washer (top loading), clothes dryer

	(electric only)
7286.D4.4	Explaining different methods for troubleshooting, including using meter and schematics and experience- based troubleshooting
7286.D4.5	Properly moving/removing appliances
7286.D4.6	Properly accessing common panels and control components on each appliance

Building and Facilities Maintenance Capstone		
Career Cluster	Construction	
Program of Study	Building and Facilities Maintenance	
NLPS Sequence	D	
Course Code	7287	
Course Description	*Building and Facilities Maintenance Capstone will continue to develop students' maintenance skills ideally through a work-based learning experience. Students will also explore additional topics like processing work orders, fair housing regulation compliance, environmental and regulation compliance, reporting and documentation of maintenance activities, and implementation of a preventive maintenance schedule.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Building and Facilities Maintenance Fundamentals; and Advanced Building and Facilities Maintenance	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Standard Trade & Industrial: Building Maintenance K-12	
Rules 46-47	● Standard Trade & Industrial: Building Maintenance 9-12 ● Occupational Specialist I, II or III: Building Maintenance 9-12	
Rules 2002	● CTE: Trade & Industrial: Building Facilities & Maintenance ● Workplace Specialist: Building Facilities & Maintenance	
REPA/REPA 3	● CTE: Trade & Industrial Building Maintenance 5-12 ● Workplace Specialist: Facilities Management & Maintenance 9-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	Certificate for Apartment Maintenance Technicians CAMT

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***HVAC***
7287.D1.1	Commonly used safety equipment, including equipment for lock-out tag-out and personal protective equipment (PPE) (gloves, eye protection, insulated tools) 010301
7287.D1.2	Helping to develop an appropriate corrective action plan (i.e., when to hire a contractor versus making repairs in house) 010608
7287.D1.3	Develop a basic understanding of Thermodynamics (pressure temperature relationship, heat transfer, vapor compression cycle)
7287.D1.4	Heating and cooling system schematics
7287.D1.5	Tool identification and use
7287.D1.6	EPA regulations regarding mercury (older thermostats) and refrigerant (Section 608 certification requirements)
7287.D1.7	Refrigeration cycle operation and repairs, including superheat and sub cool charging, Schraeder core repairs, and application of proper refrigerant handling (recovery, recycling, reusing, reclaiming)
7287.D1.8	Heating repairs (schematic and operation), including electrical furnace (forced air and convection), gas furnace, hydronic, and heat pump
7287.D1.9	Tracing issues on a schematic as to relationship and sequence
7287.D1.10	Adding/removing refrigerant (as student certification allows)
7287.D1.11	Correcting common service issues including clogged filters and clogged/obstructed coils (Evap and Condenser).
Domain	***Customer Service and Project Management***

7287.D2.1	Information found on service requests
7287.D2.2	Permission to enter “checkbox”
7287.D2.3	What to/not to write
7287.D2.4	Properly completing service request documentation
7287.D2.5	Customer service standards (e.g., no trash left behind, no use of resident’s belongings)
7287.D2.6	Fair housing laws (local, state, and federal)
7287.D2.7	Americans with Disabilities Act (ADA)
7287.D2.8	Responding appropriately to resident and prospect inquiries
7287.D2.9	Documenting work completed on service requests (e.g., date, time, people, parts, follow-up, outcome)
7287.D2.10	Protecting resident privacy
7287.D2.11	Building codes (e.g., local, state, national)
7287.D2.12	Permitting requirements (e.g., obtaining, posting requirements)
7287.D2.13	Prevailing regulations in the areas of HVAC, plumbing, electrical, appliances.
7287.D2.14	Requirements pertaining to elevators
7287.D2.15	Licensure and certification requirements for trade skills
7287.D2.16	Fire sprinkler inspections
7287.D2.17	Building fire and safety equipment and systems
7287.D2.18	Sources of information about codes, regulations, and compliance
7287.D2.19	Criteria for determining applicability and hierarchy of codes
7287.D2.20	Researching and interpreting current codes and regulations

Construction Civil Construction (Heavy Highway)							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7130	Principles of Construction Trades	7121	Civil Construction Fundamentals	7118	Advanced Civil Construction	7240	Civil Construction Capstone

Principles of Construction Trades		
Career Cluster	Construction	
Program of Study	Civil Cosntruction (Heavy Highway)	
NLPS Sequence	A	
Course Code	7130	
Course Description	*Principles of Construction Trades prepares students with the basic skills needed to continue in a construction trade field. Topics will include an introduction to the types and uses for common hand and power tools, learn the types and basic terminology associated with construction drawings, and basic safety. Additionally students will study the roles of individuals and companies within the construction industry and reinforce mathematical and communication skills necessary to be successful in the construction field.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist: Building Trades ● Workplace Specialist in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education 5-12	

	● CTE: Trade and Industrial: Building Trades 5-12 ● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Workplace Specialist in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BCTI 100: Introduction to Construction Technology
VU Course Alignment	CNST 100: Construction Seminar, CNST 120: Construction Safety
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Carpentry Specialist (46.0415), TC Carpentry Specialist (46.0415) VU - CG Construction Carpenter Assistant (46.0000)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, COMM 104: Workplace Communications, IVYT 113: Student Success in Technology VU - ENGL 101: English Composition, MATH 100+ level or higher
Promoted Certifications	NCCER Core Certification
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Construction Trades***
7130.D1.1	Comply with OSHA-10 training requirements. Explain the safety obligations of workers, supervisors, and managers to ensure a safe workplace.
7130.D1.2	Review basic mathematical functions and explain their applications to the construction trades.
7130.D1.3	Identify and explain specific applications of hand tools that are widely used in the construction industry, such as hammers, saws, levels, pullers, and clamps.
7130.D1.4	Provide detailed descriptions of commonly used power tools, such as drills, saws, grinders, and sanders. Review applications, proper use, safety, and maintenance. Demonstrate power tool use in on-the-job settings.
7130.D1.5	Discuss basic terms for construction drawings, components, and symbols. Explain the different types of drawings and interpret and use drawing dimensions.
7130.D1.6	Explain how ropes, chains, hoists, loaders, and cranes are used to move material and equipment from one location to another on a job site.
7130.D1.7	Identify the roles of individuals and companies in the construction industry.
7130.D1.8	Recognize hazards associated with materials handling and explain proper materials handling techniques and procedures.
Domain	***Construction Industry***
7130.D2.1	Recognize direct job opportunities in the - construction field.
7130.D2.2	Recognize indirect job opportunities in the -construction field.
7130.D2.3	Become familiar with new residential building products.
7130.D2.4	Understand the connection between residential construction and related fields.
7130.D2.5	Understand the importance of safety training and education in the construction industry.
7130.D2.6	Understand the relationship between worker's compensation insurance and safety record.

7130.D2.7	Understand and appreciate the roles that OSHA and INSafe play in the construction industry.
7130.D2.8	Understand the hazards involved in the residential construction industry.
7130.D2.9	Understand basic drafting/drawing techniques and how to apply them to - working drawings.
7130.D2.10	Understand the relationship between individual building components and a structure as a whole.
7130.D2.11	Utilize different resources to understand building component's applications and their limitations.
7130.D2.12	Understand basic print reading for the construction industry.
Domain	***Career Navigation***
7130.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7130.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7130.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7130.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7130.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7130.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7130.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7130.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7130.D5.1	Demonstrate computer literacy skills and basic computer functions.
7130.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7130.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7130.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Civil Construction Fundamentals	
Career Cluster	Construction
Program of Study	Civil Cosntruction (Heavy Highway)
NLPS Sequence	B
Course Code	7121
Course	*Civil Construction Fundamentals covers the first half of NCCER Heavy Highway Construction*

Description	*Level 1. Its modules cover topics such as orientation to the trade, identification of equipment used in heavy highway construction, heavy highway construction safety, work-zone safety, soils, site work, excavation math, and interpreting civil drawings. The NCCER Heavy Highway Construction Level 1 certificate will not be awarded until the student successfully completes both this course and Advanced Civil Construction.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12	
7	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade and Industrial: Building Trades 5-12 ● CTE: Trade & Industry: Construction 5-12 ● Workplace Specialist: Heavy Highway 9-12 ● Workplace Specialist: Heavy Equipment 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	BCTI 120: Introduction to Heavy Highway Construction; BCTI 110: Introduction to Concrete Finishing	
VU Course Alignment	CNST 180: Concrete and Masonry*; CNST 180L: Concrete and Masonry Lab*	
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		

Competency #	Competency
Domain	***Heavy Highway Construction***
7121.D1.1	Investigate careers, equipment, and processes used in the construction of highways and bridges.
7121.D1.2	Identify the types of heavy equipment, utility equipment, and cranes used in the construction of bridges and highways.
7121.D1.3	Examine the safety hazards and precautions associated with construction of highways and bridges with emphasis on the importance of following safety procedures to prevent accidents and injuries associated with working in hazardous places/conditions.
7121.D1.4	Analyze the signs, signals, and barricades found on various job sites including highway work-zone safety requirements.
7121.D1.5	Describe soil classification systems and explain how shrink and swell factors affect equipment selection; also discuss how soil conditions affect equipment performance and explain techniques for working with various types of soils.
7121.D1.6	Examine the methods used to set and interpret grade stakes.
7121.D1.7	List methods for controlling surface water and ground water on a job site, as well as the layout of foundations and laying of pipe.
7121.D1.8	Apply basic math skills required for site excavation work including methods and practice in calculating the areas and volumes of various geometric shapes, as well as formulas and methods used to calculate cut and fill requirements of a job.
7121.D1.9	Explain how to read site plans to calculate cut and fill requirements; interpret both roadway and construction site drawings used for excavation and grading work.
7121.D1.10	Attain readiness to take the first half of the NCCER Heavy Highway Construction Level 1 certification exams.
Domain	***Concrete Finishing***
7121.D2.1	Describe the methods and procedures used in concrete finishing. Identify terms of the trade and tools and equipment used to place, finish, and cure concrete. Explain methods and techniques for constructing concrete structures.
7121.D2.2	Explain safety requirements for concrete construction and finishing. Investigate information on OSHA requirements regarding hazard communication, fall protection, and use of personal protective equipment. Examine topics such as general work site safety, use of chemicals, and safe use of hand and power tools.
7121.D2.3	Analyze the properties of concrete and the components that make up the concrete mixture. Describe chemical and physical properties of cement, aggregate, and admixtures. Explain basic tests used to determine properties such as slump and ultimate strength.
7121.D2.4	Describe tools and equipment used in the production, placing, and curing of concrete. Explain safe operation and maintenance requirements. Demonstrate proper use of each hand tool and larger pieces of power equipment.
7121.D2.5	Investigate the methods and procedures used in preparing for placing concrete. Assess background information about site layout, forms requirements, and subgrade preparation. Describe requirements for various types of joints and reinforcement. Discuss the ordering of concrete from a mixing or batch plant.
7121.D2.6	Examine requirements and methods for properly placing concrete. Describe how to convey and place fresh concrete using various types of equipment, such as wheelbarrows, pumps and conveyors. Demonstrate techniques for spreading, consolidating, and striking off concrete.

7121.D2.7	Describe basic finishing techniques for slabs and other horizontal structures. Explain proper use of floats, trowels, edgers, and groovers and demonstrate their uses. Discuss requirements for cutting joints using different types of saws.
7121.D2.8	Compare the methods and procedures used in curing and protecting concrete. Discuss the types of curing commonly performed for both horizontal and vertical placement. Describe techniques for protecting concrete during hot and cold weather.
7121.D2.9	Describe basic problems for the processes of placing, finishing, and curing. Define symptoms of each type of problem and discuss their causes. Examine ways to reduce or eliminate these problems.
7121.D2.10	Attain readiness to take the NCCER Concrete Finishing Level I certification exams.

Advanced Civil Construction		
Career Cluster	Construction	
Program of Study	Civil Construction	
NLPS Sequence	C	
Course Code	7118	
Course Description	*Advanced Civil Construction builds upon the knowledge and skills learned in the fundamentals course and covers the second half of NCCER Heavy Highway Construction Level 1. Its modules cover topics such as rigging practices, crane safety and emergency procedures, basic principles of cranes, and crane communications. The NCCER Heavy Highway Construction Level 1 certificate and wallet card will also be awarded upon successful completion of this course.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Civil Construction Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade and Industrial: Building Trades 5-12	

	● CTE: Trade & Industry: Construction 5-12 ● Workplace Specialist: Heavy Highway 9-12 ● Workplace Specialist: Heavy Equipment 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BCTI 121: Basic Rigging
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Civil Construction and Heavy Highway Equipment
Liberal Arts/Sciences Requirements	
Promoted Certifications	NCCER Heavy Highway Level 1
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Basic Rigging***
7118.D1.1	Describe basic rigging and safety practices related to rigging activities, the use and inspection of equipment and hardware used in rigging, jacks, and hoisting equipment, and how to apply common hitches.
7118.D1.2	Apply safety standards and best safety practices relevant to the operation of cranes, and describe safety considerations related to power lines, weather conditions, and specific crane functions.
7118.D1.3	Examine mobile crane equipment with an in-depth discussion of terminology and nomenclature, and explain the basic scientific principles associated with mobile crane operation.
7118.D1.4	Demonstrate the proper communication process between the signal person and the crane operator, including electronic communications and the standard hand signals.
7118.D1.5	Attain readiness to take the second half of the NCCER Heavy Highway Construction Level 1 certification exams.
7118.D1.6	Inspect various types of rigging components and report on the condition and suitability for a task.
7118.D1.7	Configure a sling to produce a single-wrap basket hitch, double-wrap basket hitch, single wrap choker hitch, and double-wrap choker hitch.
7118.D1.8	Select the correct tagline for a specified application.
7118.D1.9	Tie specific instructor-selected knots.
7118.D1.10	Select, inspect, and demonstrate the safe use of a block and tackle, chain hoist, ratchet-lever hoist, and jack.
7118.D1.11	Verify the boom length and operating radius of a telescopic and/or lattice-boom crane using
7118.D1.12	manufacturer's data or a measuring tape.

7118.D1.13	Calculate the amount of blocking needed for the outrigger of a specific crane.
7118.D1.14	Verify that a crane is level.
7118.D1.15	Demonstrate proper crane-communication techniques using a handheld radio or another acceptable verbal-signaling device.
7118.D1.16	Demonstrate each standard hand signal depicted in 29 CFR 1926.1400, Subpart CC, Appendix A.
7118.D1.17	Direct an operator to move and place a load using the appropriate hand signals and voice communication.

Civil Construction Capstone		
Career Cluster	Construction	
Program of Study	Civil Construction	
NLPS Sequence	D	
Course Code	7240	
Course Description	*The Heavy Highway Capstone course covers topics such as introduction to earthmoving, finishing and grading, trenching and excavating, plant operations, paving, horizontal formwork, and vertical formwork. Additionally, students will learn skills associated with working with concrete and bridge construction. The course prepares students for the NCCER Level 2 certificate.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Civil Construction Fundamentals; and Advanced Civil Construction	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Industrial Arts 7-12, K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade and Industrial: Building Trades 5-12 ● CTE: Trade & Industry: Construction 5-12 ● Workplace Specialist: Heavy Highway 9-12	

	● Workplace Specialist: Heavy Equipment 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BCTI 122: Heavy Highway Construction Part 1; BCTI 123: Heavy Highway Construction Part 2; BCTI 160: Introduction to Site Layout
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Civil Construction and Heavy Highway Equipment
Liberal Arts/Sciences Requirements	
Promoted Certifications	NCCER Heavy Highway Level 2; NCCER Site Layout
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Earthmoving, Finishing, and Grading***
7240.D1.1	Discuss the process of planning and executing earthmoving activities on various types of construction projects. Explain the use of heavy equipment such as bulldozers, scrapers, excavators, and loaders.
7240.D1.2	Examine common types of equipment and instruments used for finish grading; materials and methods used to stabilize soils and control soil erosion; and finishing and grading methods used for various applications.
7240.D1.3	Examine working in and around excavations, particularly in preparing building foundations.
7240.D1.4	Describe types and bearing capacities of soils; procedures used in shoring, shielding, and sloping trenches and excavations; trenching safety requirements, including recognition of unsafe conditions; and mitigation of groundwater and rock when excavating foundations.
7240.D1.5	Describe the operation of plants used to manufacture concrete and asphalt paving and discuss the different types of aggregates.
7240.D1.6	Analyze paving operations, paving equipment, recycling processes, and quality control requirements for both concrete and hot-mix asphalt paving.
7240.D1.7	Describe elevated decks and formwork systems and methods used in their construction.
7240.D1.8	Examine joist, pan, beam and slab, flat slab, composite slab, and specialty form systems and discuss instructions for the use of flying decks, as well as shoring and reshoring systems.
7240.D1.9	Discuss the applications and construction methods for types of forming and form hardware systems for walls, columns, and stairs, as well as slip and climbing forms. Describe the assembly, erection, and stripping of gang forms.
7240.D1.10	Draw a plan for basic earthmoving operations and include clearing and grubbing, excavating the foundation, constructing embankments, backfilling, and compacting.
7240.D1.11	Lay out a basic earthmoving operation.
7240.D1.12	Identify and select the proper equipment for a given earthmoving operation.
7240.D1.13	Establish fine grade after a rough grade has been performed, according to instructions.

7240.D1.14	Draft a job hazard/safety analysis for an excavation according to instructor's specifications.
7240.D1.15	Demonstrate setting the stringline to establish the grade for concrete slipform paving, correctly set up the slipform paver for operation, perform slipform paving, and perform a concrete slump test.
7240.D1.16	At the discretion of the instructor, perform hot-mix asphalt paving, also perform a quantitative analysis on the segregation of stone.
7240.D1.17	Erect, plumb, brace, and level a hand-set deck form.
7240.D1.18	Install edge forms, including instructor-selected block outs, embedment's, and bulkheads.
7240.D1.19	Erect, plumb, and brace an instructor-selected wall form.
7240.D1.20	Erect, plumb, and brace a stair form.
Domain	***Concrete, Ironwork, and Bridge Construction***
7240.D2.1	Explain the selection and uses of different types of reinforcing materials. Describe requirements for bending, cutting, splicing, and tying reinforcing steel and the placement of steel in footings and foundations, walls, columns, and beams and girders.
7240.D2.2	Analyze the safety concerns associated with concrete, as well as concrete testing, concrete admixtures, and the proper procedures for placing concrete.
7240.D2.3	Identify the materials used in steel-framed structures and explain how to read basic structural blueprints.
7240.D2.4	Discuss the types of construction that utilize structural steel, the components of the structures, and the process involved in erecting a steel structure. Explain the principles of structural stresses and the requirements of bolted connections.
7240.D2.5	Describe the common types of bridges, along with the components that make up the substructure and superstructure of a bridge. Also discuss the types of materials used in bridge construction, basic surveying equipment and practices, and how to interpret bridge drawings.
7240.D2.6	Describe the types of footings used to support bridges, as well as various types of piles and pile- driving methods. Also discuss safety practices associated with pile driving on land and in marine environments, along with environmental protection issues.
7240.D2.7	Identify the forms used to fabricate concrete walls, columns, footings, pile caps, and other bridge structures. Also discuss site-built and manufactured forming systems along with instructions for cleaning and storing forms.
7240.D2.8	Attain readiness to take the NCCER Heavy Highway Construction Level 2 certification exams.
7240.D2.9	Use appropriate tools to cut and bend reinforcing bars.
7240.D2.10	Demonstrate five types of ties for reinforcing bars, along with proper lap splicing.
7240.D2.11	Demonstrate the proper placement, spacing, tying, and support for reinforcing bars.
7240.D2.12	Identify job plans and drawings used for ironworking jobs.
7240.D2.13	Identify ornamental ironwork, general symbols, and welding symbols and applications on ironworking job plans and drawings.
7240.D2.14	Describe different uses for structural steel.
7240.D2.15	Identify selected types, shapes, and grades of structural steel, including types of structural steel beams.
7240.D2.16	Make bolted connections on structural steel.
7240.D2.17	Use a bridge plan to explain the details of a project, and perform layout based on a plan sheet.
7240.D2.18	Lay out pile locations according to foundation drawings.
7240.D2.19	Create templates in accordance with provided drawings.

7240.D2.20	Perform a material takeoff for concrete formwork.
7240.D2.21	Build a small cap form at least 4’ x 3’ with headers, and include a beam seat, anchor bolts, and pipe block out.
Domain	***Site Layout***
7240.D3.1	Investigate the site layout trade and related tasks.
7240.D3.2	Demonstrate the use of the builder’s level and leveling rods, as well as the equipment and procedures for making distance measurements by taping (chaining).
7240.D3.3	Explain the elements of professional conduct, safety, and communications.
7240.D3.4	Describe the aspects of an apprenticeship program and the career path and professional opportunities related to the site layout trade.
7240.D3.5	Examine the metric system, including how to convert between English and metric system units.
7240.D3.6	Describe basic concepts for working with formulas and equations, as well as the basic concepts of geometry and right-angle trigonometry.
7240.D3.7	Describe the use and care of tools and instruments commonly used to perform site survey work.
7240.D3.8	Discuss the instruments and procedures used for making distance measurements electronically and for performing differential leveling and basic horizontal and vertical angular measurements. Follow guidelines for recording surveying measurement data in field notes.
7240.D3.9	Discuss the techniques for reading and using blueprints and specifications, with an emphasis placed on those drawings and types of information that are relevant to the site layout trade.
7240.D3.10	Attain readiness to take NCCER Site Layout certification exams.

Construction Construction Trades - Carpentry							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7130	Principles of Construction Trades	7123	Construction Trades: General Carpentry	7122	Construction Trades: Framing and Finishing	7242	Construction Trades Capstone
				7390	Construction Trades: Masonry Fundamentals	7391	Masonry Capstone

Principles of Construction Trades		
Career Cluster	Construction	
Program of Study	Construction Trades - Carpentry	
NLPS Sequence	A	
Course Code	7130	
Course Description	*Principles of Construction Trades prepares students with the basic skills needed to continue in a construction trade field. Topics will include an introduction to the types and uses for common hand and power tools, learn the types and basic terminology associated with construction drawings, and basic safety. Additionally students will study the roles of individuals and companies within the construction industry and reinforce mathematical and communication skills necessary to be successful in the construction field.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist: Building Trades	

	● Workplace Specialist in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade and Industrial: Building Trades 5-12 ● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Workplace Specialist in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BCTI 100: Introduction to Construction Technology
VU Course Alignment	CNST 100: Construction Seminar, CNST 120: Construction Safety
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Carpentry Specialist (46.0415), TC Carpentry Specialist (46.0415) VU - CG Construction Carpenter Assistant (46.0000)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; COMM 104: Workplace Communications, IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, MATH 100+ level or higher
Promoted Certifications	NCCER Core Certification
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Construction Trades***
7130.D1.1	Comply with OSHA-10 training requirements. Explain the safety obligations of workers, supervisors, and managers to ensure a safe workplace.
7130.D1.2	Review basic mathematical functions and explain their applications to the construction trades.
7130.D1.3	Identify and explain specific applications of hand tools that are widely used in the construction industry, such as hammers, saws, levels, pullers, and clamps.
7130.D1.4	Provide detailed descriptions of commonly used power tools, such as drills, saws, grinders, and sanders. Review applications, proper use, safety, and maintenance. Demonstrate power tool use in on-the-job settings.
7130.D1.5	Discuss basic terms for construction drawings, components, and symbols. Explain the different types of drawings and interpret and use drawing dimensions.
7130.D1.6	Explain how ropes, chains, hoists, loaders, and cranes are used to move material and equipment from one location to another on a job site.
7130.D1.7	Identify the roles of individuals and companies in the construction industry.
7130.D1.8	Recognize hazards associated with materials handling and explain proper materials handling techniques and procedures.
Domain	***Construction Industry***
7130.D2.1	Recognize direct job opportunities in the - construction field.
7130.D2.2	Recognize indirect job opportunities in the -construction field.
7130.D2.3	Become familiar with new residential building products.

7130.D2.4	Understand the connection between residential construction and related fields.
7130.D2.5	Understand the importance of safety training and education in the construction industry.
7130.D2.6	Understand the relationship between worker's compensation insurance and safety record.
7130.D2.7	Understand and appreciate the roles that OSHA and INSafe play in the construction industry.
7130.D2.8	Understand the hazards involved in the residential construction industry.
7130.D2.9	Understand basic drafting/drawing techniques and how to apply them to - working drawings.
7130.D2.10	Understand the relationship between individual building components and a structure as a whole.
7130.D2.11	Utilize different resources to understand building component's applications and their limitations.
7130.D2.12	Understand basic print reading for the construction industry.
Domain	***Career Navigation***
7130.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7130.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7130.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7130.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7130.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7130.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7130.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7130.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7130.D5.1	Demonstrate computer literacy skills and basic computer functions.
7130.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7130.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7130.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Construction Trades: General Carpentry	
Career Cluster	Construction
Program of Study	Construction Trades - Carpentry

NLPS Sequence	B	
Course Code	7123	
Course Description	*Construction Trades: General Carpentry builds upon the skills learned in the Principles of Construction Trades and examines the basics of framing. This includes studying the procedures for laying out and constructing floor systems, wall systems, ceiling joist and roof framing, and basic stair layout. Additionally, students will be introduced to building envelope systems.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades or Principles of Architecture; Engineering and Construction	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist: Building Trades ● Workplace Specialist in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade and Industrial: Building Trades 5-12 ● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Workplace Specialist in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	BCTI 101: Introduction to Carpentry, Part 1; BCTI 102: Introduction to Carpentry, Part 2	
VU Course Alignment	CNST 105/105L (Lab): Framing/Framing Laboratory	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Carpentry Specialist (46.0415), TC Carpentry Specialist (46.0415) VU - CG Construction Carpenter Assistant (46.0000)	
Liberal Arts/Sciences	ITCC - MATH 122: Applied Technical Mathematics; COMM 104: Workplace Communications, IVYT 113: Student Success in Technology	

Requirements	VU - ENGL 101: English Composition I, MATH 100+ level or higher
Promoted Certifications	NCCER Carpentry Level 1

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Carpentry***
7123.D1.1	Review the history of the trade, describe the apprentice program, identify career opportunities for carpentry and construction workers, and list the skills, responsibilities, and characteristics a worker should possess. Discuss the importance of safety in the construction industry.
7123.D1.2	Categorize the building materials used in construction work, including lumber, sheet materials, engineered wood products, structural concrete, and structural steel. Describe the fasteners and adhesives used in construction work. Discuss the methods of squaring a building.
7123.D1.3	Provide descriptions of hand tools and power tools used by carpenters. Demonstrate safe and proper operation, as well as care and maintenance.
7123.D1.4	Apply the techniques for reading and using construction drawings and specifications with an emphasis on drawings and information relevant to the carpentry trade. Generate quantity takeoffs.
7123.D1.5	Examine framing basics and the procedures for laying out and constructing a wood floor using common lumber, as well as engineered building materials.
Domain	***Carpentry Basics***
7123.D2.1	Describe procedures for laying out and framing walls, including roughing-in door and window openings, constructing corners, partition Ts, and bracing walls. Follow the procedure to estimate the materials required to frame walls.
7123.D2.2	Describe types of roofs and list instructions for laying out rafters for gable roofs, hip roofs, and valley intersections. Compare stick-built and truss-built roofs. List the basics of roof sheathing installation.
7123.D2.3	Investigate the concept of the building envelope and explain its components. Describe types of windows, skylights, and exterior doors, and list instructions for installation.
7123.D2.4	Compare types of stairs and common building code requirements related to stairs. Examine techniques for measuring and calculating rise, run, and stairwell openings, laying out stringers, and fabricating basic stairways.
7123.D2.5	Attain readiness to take NCCER Carpentry Level I certification exams.
7123.D3.1	Understand the application of conventional fiberglass/asphalt roof shingles.
7123.D3.2	Apply carpentry skills, methods, and techniques to lab and/or on-the-job settings.

Construction Trades: Framing and Finishing	
Career Cluster	Construction
Program of Study	Construction Trades - Carpentry
NLPS Sequence	C
Course Code	7122

Course Description	*Construction Trades: Framing and Finishing prepares students with advanced framing skills along with interior and exterior finishing techniques. Topics include roofing applications, thermal and moisture protection, exterior finishing, cold-formed steel framing, drywall installation and finishing, doors and door hardware, suspended ceilings, window, door, floor, and ceiling trim, and cabinet installation.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Construction Trades: General Carpentry	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist: Building Trades ● Workplace Specialist in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade and Industrial: Building Trades 5-12 ● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Workplace Specialist in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	BCTI 103: Carpentry Framing and Finishing, Part 1; BCTI 104: Carpentry Framing and Finishing, Part 2	
VU Course Alignment	CNST 160/160L (Lab): Finish Carpentry/Finish Carpentry Laboratory	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Carpentry Specialist (46.0415), TC Carpentry Specialist (46.0415) VU - CG Construction Carpenter Assistant (46.0000)	
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics; COMM 104: Workplace Communications; IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, MATH 100+ level or higher	
Promoted	NCCER Carpentry Framing and Finishing Level 2	

Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Framing and Finishing***
7122.D1.1	Demonstrate how to read and interpret a set of commercial drawings and specifications.
7122.D1.2	Describe the types and grades of steel framing materials and follow instructions for selecting and installing metal framing for interior and exterior walls, loadbearing and nonbearing walls, partitions, and other applications.
7122.D1.3	Analyze the various types of exterior finish materials and their installation procedures, including wood, metal, vinyl, and fiber-cement siding.
7122.D1.4	Describe the selection and installation of various types of insulating materials in walls, floors, and attics. List the uses and installation practices for vapor barriers and waterproofing materials.
7122.D1.5	Demonstrate how to properly prepare the roof deck and install roofing for residential and commercial buildings.
Domain	***Framing and Finishing Basics***
7122.D2.1	Explain the installation of metal doors and related hardware in steel-framed, wood-framed, and masonry walls, along with their related hardware, such as locksets and door closers. Discuss the installation of wood doors, folding doors, and pocket doors.
7122.D2.2	Describe the various types of gypsum drywall, their uses, and the fastening devices and methods used to install them. Follow detailed instructions for installing drywall on walls and ceilings using nails, drywall screws, and adhesives. Discuss fire- and sound-rated walls.
7122.D2.3	List the materials, tools, and methods used to finish and patch gypsum drywall. Discuss both automatic and manual taping and finishing tools.
7122.D2.4	Examine the materials, layout, and installation procedures for many types of suspended ceilings used in commercial construction, as well as ceiling tiles, drywall suspension systems, and pan-type ceilings
7122.D2.5	Describe the different types of trim used in finish work and demonstrate the proper methods for selecting, cutting, and fastening trim to provide a professional finished appearance. (Wall/ trim finishes painting – staining)
7122.D2.6	Follow detailed instructions for the selection and installation of base and wall cabinets and countertops.
7122.D2.7	Attain readiness to take the NCCER Carpentry Framing and Finishing Level 2 certification exams.
7122.D3.1	Learn to complete quality inspections/checks on each task
7122.D3.2	Apply recognized construction standards

Construction Trades: Masonry Fundamentals	
Career Cluster	Construction
Program of Study	Construction Trades - Carpentry
NLPS Sequence	C

Course Code	7390
Course Description	*The Masonry Fundamentals course covers foundations of completing masonry work including safety, tools, and the basics of brick and block construction. After mastering the basics, students will be introduced to advanced masonry techniques including control and expansion joints, corners, and intersections. Students will also understand the impacts of climate on masonry work and how to inspect masonry work for quality control.*
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Construction Trades: General Carpentry
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12
Rules 2002	● Technology Education with high school setting ● Workplace Specialist: Building Trades ● Workplace Specialist in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade and Industrial: Building Trades 5-12 ● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Workplace Specialist in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BCTI 140: Introduction to Masonry
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	VU - CG Construction Carpenter Assistant (46.0000)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, COMM 104: Workplace Communications, IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, MATH 100+ level or higher

Promoted Certifications	NCCER - Masonry - Level 1
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Masonry***
7390.D1.1	Examine information about basic masonry materials, tools, techniques, and safety precautions.
7390.D1.2	Explain how to mix mortar by hand and lay masonry units.
7390.D1.3	Describe the skills, attitudes, and abilities of successful masons.
Domain	***Masonry Safety***
7390.D2.1	Describe how to identify the common causes of accidents and the hazards associated with masonry tools, equipment, mortar, and concrete.
7390.D2.2	Discuss use of personal protective equipment, working safely from elevated surfaces, properly using masonry tools and equipment, and handling masonry materials safely.
Domain	***Masonry Tools & Equipment***
7390.D3.1	Describe a variety of hand tools, measuring tools, mortar equipment, power tools and equipment, and lifting equipment masons use on the job.
7390.D3.2	List instructions for assembling and disassembling scaffolds.
Domain	***Measurements, Drawings, and Specifications***
7390.D4.1	Review the calculation of distances and areas common in masonry work.
7390.D4.2	Describe the information found on residential construction drawings.
7390.D4.3	Explain the role of specifications, standards, and codes.
Domain	***Mortar***
7390.D5.1	Explain the types and properties of mortar and the materials used in the mixture, including admixtures.
7390.D5.2	List instructions for mixing mortar by machine.
7390.D5.3	Describe how to properly apply and store mortar.
Domain	***Masonry Units and Installation Techniques***
7390.D6.1	Describe characteristics of block and brick and how to set up, lay out, bond, cut, lay and tool, and how to clean block and brick once they have been laid.
7390.D6.2	Examine masonry reinforcements and accessories used to lay block and brick professionally and safely.
Domain	***Certification***
7390.D7.1	Attain readiness to take NCCER Masonry Level 1 certification exams.

Construction Trades Capstone	
Career Cluster	Construction
Program of Study	Construction Trades - Carpentry
NLPS Sequence	D
Course Code	7242

Course Description	*The Construction Trades Capstone course covers the basics of electricity and working with concrete. Electrical topics include the National Electric Code, electrical safety, electrical circuits, basic electrical construction drawings, and residential electrical services. Students may also gain an understanding of concrete properties, foundations, slab-on-grades, and vertical and horizontal formwork. The course prepares students for the NCCER Carpentry Forms Level 3 and Electrical Level 1 certificates.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Construction Trades: General Carpentry; and Construction Trades: Framining and Finishing	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Engineering K-12 ● Appropriate Vocational License	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: CivilArchitectural Engineering 9- 12 ● Occupational Specialist I, II or III: Civil-Architectural Engineering 9-12 ● Occupational Specialist I, II or III: Building Trades Technology 9-12 ● Appropriate Vocational License ● Occupational Specialist in related course approved for a CTE pathway	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Civil-Architectural Engineering Workplace Specialist: CivilArchitectural Engineering ● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Appropriate CTE License with high school setting ● Workplace Specialist in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial CivilArchitectural Engineering 5-12 ● Workplace Specialist: Engineering 9- 12 ● Workplace Specialist: Construction 9- 12 ● Workplace Specialist: Building Trades 9-12 ● Appropriate CTE License 5-12 ● Workplace Specialist in related course approved for a CTE Pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course	BCTI 130: Introduction to Electrical; BCTI 201: Carpentry Forms, Part 1; BCTI 202: Carpentry	

Alignment	Forms, Part 2; BCTI 280: Co-Op/Internship
VU Course Alignment	VU-EC - CNST 155/155L (LAB): Electrical Wiring
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CTCarpentry Specialist (46.0415), TC Carpentry Specialist (46.0415) VU-EC - CG Construction Carpenter Assistant (46.0000)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, COMM 104: Workplace Communications, IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, MATH 100+ level or higher
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Electrical***
7242.D1.1	Describe the electrical trade and discuss the career paths available to electricians.
7242.D1.2	Discuss safety rules and regulations for electricians, including precautions for electrical hazards found on the job. Examine the OSHA-mandated lockout/tagout procedure.
7242.D1.3	Explain electrical concepts used in Ohm's law applied to DC series circuits. Discuss atomic theory, electromotive force, resistance, and electric power equations.
7242.D1.4	Analyze series, parallel, and series-parallel circuits. Examine resistive circuits, Kirchhoff's voltage and current laws, and circuit analysis.
7242.D1.5	Examine and use the NEC®. Describe the layout and the types of information found within the code book. Practice finding information using easy-to-follow procedures.
7242.D1.6	Identify the hardware and systems used by an electrician to mount and support boxes, receptacles, and other electrical components. Examine NEC® fill and pull requirements for device, pull, and junction boxes under 100 cubic inches.
7242.D1.7	Describe conduit bending and installation. Demonstrate the techniques for using hand operated and step conduit benders, as well as cutting, reaming, and threading conduit. 8. List the types and applications of raceways, wireways, and ducts. Investigate the appropriate NEC® requirements.
7242.D1.8	List the types and applications of raceways, wireways, and ducts. Investigate the appropriate NEC® requirements.
7242.D1.9	Describe the types and applications of conductors and demonstrate proper wiring techniques. Investigate the appropriate NEC® requirements.
7242.D1.10	Examine electrical prints, drawings, and symbols, and the types of information that can be found on schematics, one-lines, and wiring diagrams.
7242.D1.11	Investigate the electrical devices and wiring techniques common to residential construction and maintenance. Perform service calculations. Investigate the appropriate NEC® requirements.
7242.D1.12	Demonstrate proper selection, inspection, and use of common electrical test equipment, including voltage testers, clamp-on ammeters, ohmmeters, multimeters, phase/motor rotation testers, and data recording equipment. Describe safety precautions and meter category ratings.

7242.D1.13	Attain readiness to take NCCER Electrical Level I certification exams.
Domain	***Carpentry Forms 1***
7242.D2.1	Describe the properties, characteristics, and uses of cement, aggregates, and other materials used in different types of concrete. Discuss procedures for estimating concrete volume and testing freshly mixed concrete, as well as methods and materials for curing concrete.
7242.D2.2	Explain how ropes, chains, hoists, loaders, and cranes are used to move material and equipment from one location to another on a job site. Describe inspection techniques and load-handling safety practices. Demonstrate American National Standards Institute (ANSI) hand signals.
7242.D2.3	Examine working in and around excavations, particularly in preparing building foundations. Describe types and bearing capacities of soils; procedures used in shoring, shielding, and sloping trenches and excavations; trenching safety requirements, including recognition of unsafe conditions; and mitigation of groundwater and rock when excavating foundations.
7242.D2.4	Explain the selection and uses of different types of reinforcing materials. Describe requirements for bending, cutting, splicing, and tying reinforcing steel and the placement of steel in footings and foundations, walls, columns, and beams and girders.
7242.D2.5	Discuss basic site layout safety, tools, and methods; layout and construction of deep and shallow foundations; types of foundation forms; layout and formation of slabs-on-grade; and forms used for curbing and paving.
7242.D2.6	Attain readiness to take the first half of NCCER Carpentry Forms Level 3 certification exams.
Domain	***Carpentry Forms 2***
7242.D3.1	Discuss the applications and construction methods for types of forming and form hardware systems for walls, columns, and stairs, as well as slip and climbing forms. Describe the assembly, erection, and stripping of gang forms.
7242.D3.2	Describe elevated decks and formwork systems and methods used in their construction. Examine joist, pan, beam and slab, flat slab, composite slab, and specialty form systems and discuss instructions for the use of flying decks, as well as shoring and reshoring systems.
7242.D3.3	Examine tools, equipment, and procedures for safely handling, placing, and finishing concrete. Describe joints made in concrete structures and the use of joint sealants.
7242.D3.4	Describe how tilt-up concrete construction is used and how tilt-up panels are formed, erected, and braced. Discuss the installation of rebar and types of embedment used to lift and brace the panels. Investigate methods used to create architectural and decorative treatments.
7242.D3.5	Attain readiness to take the second half of NCCER Carpentry Forms Level 3 certification exams.
Domain	***WBL***
7242.D3.1	Gain practical experience on the job.
7242.D3.2	Think critically and independently to analyze, synthesize, and evaluate technical problems and information.
7242.D3.3	Identify and interpret health, safety, and welfare standards as dictated by local, state or federal agencies.
Domain	***Electrical Code***
7242.D4.1	Understand residential code and how to utilize a code manual.
7242.D4.2	Understand residential electrical principles and terminology.
7242.D4.3	Understand common and complex residential wiring diagrams and their applications.
7242.D4.4	Interpret and apply the National Electrical Code (NEC) to residential electrical applications.

7242.D4.5	Understand the connection between wire types and wire sizes and how it relates to residential electrical safety.
7242.D4.6	Diagnose and troubleshoot residential electrical problems using critical and creative thinking skills.
7242.D4.7	Utilize proper planning techniques when designing a residential electrical plan for remodeling or new construction.

Masonry Capstone	
Career Cluster	Construction
Program of Study	Construction Trades - Carpentry
NLPS Sequence	D
Course Code	7391
Course Description	*The Masonry Capstone course covers the basics of brick and block construction. The course is aligned to an entry level apprenticeship program through the International Union of Bricklayers & Allied Craftworkers Indiana/Kentucky. The program includes approximately 300 hours of instruction with on-the-job training.*
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Construction Trades: General Carpentry; and Construction Trades: Masonry Fundamentals
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	Counts as a Directed Elective or Elective for all diplomas Counts as a quantitative reasoning course*
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12
Rules 2002	● Technology Education with high school setting ● Workplace Specialist: Building Trades ● Workplace Specialist in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade and Industrial: Building Trades 5-12

	● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Workplace Specialist in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	VU - CG Construction Carpenter Assistant (46.0000)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, COMM 104: Workplace Communications, IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, MATH 100+ level or higher
Promoted Certifications	NCCER - Masonry - Level 2
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Residential Plans and Drawing Interpretation***
7391.D1.1	Explain the organization of residential plans and drawings.
7391.D1.2	Interpret dimensions and scales on drawings.
7391.D1.3	Interpret information on residential plans.
7391.D1.4	Estimate material quantities from plans and drawings.
Domain	***Residential Masonry***
7391.D2.1	Explain the requirements for construction of various types of residential foundations.
7391.D2.2	Identify and explain the characteristics, uses, and installation techniques for brick pavers.
7391.D2.3	Lay out and build steps, patios, and decks made from masonry units.
7391.D2.4	Lay out and build chimneys and fireplaces.
Domain	***Grout and Other Reinforcement***
7391.D3.1	Name and describe the primary ingredients in grout and their properties.
7391.D3.2	Identify the different types of grout used in masonry work.
7391.D3.3	Describe the common admixtures and their uses.
7391.D3.4	Describe the use of steel bar reinforcement in masonry construction.
7391.D3.5	Apply grout in low and high lifts using the proper techniques.
7391.D3.6	Place grout in a hollow block wall and rod it into place.
Domain	***Metal Work in Masonry***
7391.D4.1	Describe the uses and installation of vertical reinforcement.
7391.D4.2	Describe the uses and installation of different types of horizontal joint reinforcements and ties.
7391.D4.3	Describe the uses and installation of different anchors, fasteners, and embedded items.
7391.D4.4	Install hollow metal frames.

7391.D4.5	Describe the functions of sills and lintels.
7391.D4.6	Install sills and lintels.
7391.D4.7	Install metal hardware.
Domain	***Advanced Laying Techniques***
7391.D5.1	Recognize the structural principles and fundamental uses of basic types of walls.
7391.D5.2	Recognize the requirement for, and function of, control joints and expansion joints.
7391.D5.3	Build various types of walls using proper reinforcement, jointing, and bonding techniques.
7391.D5.4	Lay out specialty structures such as maintenance holes, segmented block walls, and screens.
7391.D5.5	Identify and explain the different types of masonry arches used today.
7391.D5.6	Lay out a semicircular arch and a jack arch.
Domain	***Construction Techniques and Moisture Control***
7391.D6.1	Explain and demonstrate techniques for constructing masonry around windows, doors, and other openings.
7391.D6.2	Explain the requirements for wall bracing, and demonstrate the techniques used to construct pilasters and other types of bracing.
7391.D6.3	Identify the various types of insulation used in conjunction with masonry construction and explain installation techniques.
7391.D6.4	Identify the need for moisture control in various types of masonry construction, and demonstrate the techniques used to eliminate moisture problems.
7391.D6.5	Construct corbeling in a double-wythe wall.
7391.D6.6	Join intersecting walls.
7391.D6.7	Install flashing.
Domain	***Construction Inspection and Quality Control***
7391.D7.1	Describe industry standards for quality control.
7391.D7.2	Describe how to build masonry sample panels and prisms.
7391.D7.3	Perform a slump test.
7391.D7.4	Describe and perform field inspections.

Construction Construction Trades - Electrical							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7130	Principles of Construction Trades	7124	Electrical Fundamentals	7119	Advanced Electrical	7263	Construction Trades Electrical Capstone

Principles of Construction Trades		
Career Cluster	Construction	
Program of Study	Building and Facilities Management, Civil Construction (Heavy Highway), Construction Trades – Carpentry, Construction Trades – Electrical, Heavy Equipment Operations	
NLPS Sequence	A	
Course Code	7130	
Course Description	*Principles of Construction Trades prepares students with the basic skills needed to continue in a construction trade field. Topics will include an introduction to the types and uses for common hand and power tools, learn the types and basic terminology associated with construction drawings, and basic safety. Additionally students will study the roles of individuals and companies within the construction industry and reinforce mathematical and communication skills necessary to be successful in the construction field.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist: Building Trades ● Workplace Specialist in related course approved for a CTE pathway	

REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade and Industrial: Building Trades 5-12 ● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Workplace Specialist in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BCTI 100: Introduction to Construction Technology
VU Course Alignment	CNST 100: Construction Seminar, CNST 120: Construction Safety
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Carpentry Specialist (46.0415), TC Carpentry Specialist (46.0415) VU - CG Construction Carpenter Assistant (46.0000)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, COMM 104: Workplace Communications, IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, MATH 100+ level or higher
Promoted Certifications	NCCER Core Certification
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Construction Trades***
7130.D1.1	Comply with OSHA-10 training requirements. Explain the safety obligations of workers, supervisors, and managers to ensure a safe workplace.
7130.D1.2	Review basic mathematical functions and explain their applications to the construction trades.
7130.D1.3	Identify and explain specific applications of hand tools that are widely used in the construction industry, such as hammers, saws, levels, pullers, and clamps.
7130.D1.4	Provide detailed descriptions of commonly used power tools, such as drills, saws, grinders, and sanders. Review applications, proper use, safety, and maintenance. Demonstrate power tool use in on-the-job settings.
7130.D1.5	Discuss basic terms for construction drawings, components, and symbols. Explain the different types of drawings and interpret and use drawing dimensions.
7130.D1.6	Explain how ropes, chains, hoists, loaders, and cranes are used to move material and equipment from one location to another on a job site.
7130.D1.7	Identify the roles of individuals and companies in the construction industry.
7130.D1.8	Recognize hazards associated with materials handling and explain proper materials handling techniques and procedures.
Domain	***Construction Industry***
7130.D2.1	Recognize direct job opportunities in the - construction field.
7130.D2.2	Recognize indirect job opportunities in the -construction field.
7130.D2.3	Become familiar with new residential building products.
7130.D2.4	Understand the connection between residential construction and related fields.
7130.D2.5	Understand the importance of safety training and education in the construction industry.

7130.D2.6	Understand the relationship between worker's compensation insurance and safety record.
7130.D2.7	Understand and appreciate the roles that OSHA and INSafe play in the construction industry.
7130.D2.8	Understand the hazards involved in the residential construction industry.
7130.D2.9	Understand basic drafting/drawing techniques and how to apply them to - working drawings.
7130.D2.10	Understand the relationship between individual building components and a structure as a whole.
7130.D2.11	Utilize different resources to understand building component's applications and their limitations.
7130.D2.12	Understand basic print reading for the construction industry.
Domain	***Career Navigation***
7130.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7130.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7130.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7130.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7130.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7130.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7130.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7130.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7130.D5.1	Demonstrate computer literacy skills and basic computer functions.
7130.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7130.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7130.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Electrical Fundamentals	
Career Cluster	Construction
Program of Study	Construction Trades - Electrical
NLPS Sequence	B
Course Code	7124

Course Description	*This course covers NCCER Electrical Level 1. Its modules cover topics such as orientation to the electrical trade, electrical safety, introduction to electrical circuits, electrical theory, introduction to the National Electrical Code, device boxes, hand bending, raceways and fittings, conductors and cables, basic electrical construction drawings, residential electrical services, and electrical test equipment. The NCCER Electrical Level 1 certificate and wallet card will also be awarded upon successful completion of this course.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Workplace Specialist: Industrial Technology or Industrial Electronics ● Technology Education	
REPA/REPA 3	● CTE: Trade & Industrial: Building Trades 5-12 ● CTE: Trade & Industry: Electrician 5-12 ● Workplace Specialist: Electrical 9-12 ● Workplace Specialist: Industrial Technology or Industrial Electronics 9-12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	BCTI 130: Introduction to Electrical	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC – CT Carpentry Specialist (46.0415), TC Carpentry Specialist (46.0415)	
Liberal Arts/Sciences Requirements		

Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Basic Electrical***
7124.D1.1	Describe the electrical trade and discuss the career paths available to electricians.
7124.D1.2	Discuss safety rules and regulations for electricians, including precautions for electrical hazards found on the job. Examine the OSHA-mandated lockout/tagout procedure.
7124.D1.3	Explain electrical concepts used in Ohm's law applied to DC series circuits. Discuss atomic theory, electromotive force, resistance, and electric power equations.
7124.D1.4	Analyze series, parallel, and series-parallel circuits. Examine resistive circuits, Kirchhoff's voltage and current laws, and circuit analysis.
7124.D1.5	Examine and use the NEC®. Describe the layout and the types of information found within the code book. Practice finding information using easy-to-follow procedures.
7124.D1.6	Identify the hardware and systems used by an electrician to mount and support boxes, receptacles, and other electrical components. Examine NEC® fill and pull requirements for device, pull, and junction boxes under 100 cubic inches.
7124.D1.7	Describe conduit bending and installation. Demonstrate the techniques for using hand operated and step conduit benders, as well as cutting, reaming, and threading conduit. 8. List the types and applications of raceways, wireways, and ducts. Investigate the appropriate NEC® requirements.
7124.D1.8	Describe the types and applications of conductors and demonstrate proper wiring techniques. Investigate the appropriate NEC® requirements.
7124.D1.9	Examine electrical prints, drawings, and symbols, and the types of information that can be found on schematics, one-lines, and wiring diagrams
7124.D1.10	Investigate the electrical devices and wiring techniques common to residential construction and maintenance. Perform service calculations. Investigate the appropriate NEC® requirements.
7124.D1.11	Demonstrate proper selection, inspection, and use of common electrical test equipment, including voltage testers, clamp-on ammeters, ohmmeters, multimeters, phase/motor rotation testers, and data recording equipment. Describe safety precautions and meter category ratings.

Advanced Electrical	
Career Cluster	Construction
Program of Study	Construction Trades - Electrical
NLPS Sequence	C

Course Code	7119	
Course Description	*Advanced Electrical covers topics such as alternating current, motors: theory and application, electric lighting, conduit bending, and pull and junction boxes. The second part of the course will cover topics such as conductor installations, cable tray, conductor terminations and splices, grounding and bonding, circuit breakers and fuses, control systems and fundamental concepts. Students will be ready to complete the NCCER Electrical Level 2 certificate upon successful completion of the course.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Electrical Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Workplace Specialist: Industrial Technology or Industrial Electronics ● Technology Education	
REPA/REPA 3	● CTE: Trade & Industrial: Building Trades 5-12 ● CTE: Trade & Industry: Electrician 5-12 ● Workplace Specialist: Electrical 9-12 ● Workplace Specialist: Industrial Technology or Industrial Electronics 9-12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	BCTI 131: Electrical Part 1; BCTI 132: Electrical Part 2	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal		

Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Electrical Part 1***
7119.D1.1	Describe forces that are characteristic of alternating-current systems and the application of Ohm's law to AC circuits.
7119.D1.2	Examine AC and DC motors, including the main components, circuits, and connections.
7119.D1.3	List principles of human vision and the characteristics of light. Discuss the handling and installation of various types of lamps and lighting fixtures.
7119.D1.4	Discuss bends in conduit up to 6 inches. Examine mechanical, hydraulic, and electrical benders.
7119.D1.5	Explain how to select and size pull boxes, junction boxes, and handholes.
Domain	***Electrical Part 2***
7119.D2.1	Discuss the transportation, storage, and setup of cable reels; methods of rigging; and procedures for complete cable pulls in raceways and cable trays.
7119.D2.2	Examine NEC® installation requirements for cable tray, including cable installations.
7119.D2.3	Describe methods of terminating and splicing conductors, including preparing and taping conductors.
7119.D2.4	Explain the purpose of grounding and bonding electrical systems. Investigate NEC® requirements.
7119.D2.5	Describe fuses and circuit breakers along with their practical applications. Size circuit breakers.
7119.D2.6	Examine basic descriptions of various types of contactors and relays along with their practical applications.
7119.D2.7	Attain readiness to take the NCCER Electrical Level 2 certification exams.

Construction Trades Electrical Capstone	
Career Cluster	Construction
Program of Study	Construction Trades - Electrical
NLPS Sequence	D
Course Code	7263
Course Description	*Construction Trades Electrical Capstone builds upon the skills learned in Electrical Fundamentals and Advanced Electrical. Topics include load calculations – branch and feeder circuits, conductor selection and calculations, practical applications of lighting. This course*

	will also cover commercial electrical services including distribution equipment, transformers, and voice, data and video. Completion of this course will prepare students for the NCCER Electrical Level 3 certificate. Students may also complete an Ivy Tech CT by completing coursework in general carpentry.
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Electrical Fundamentals; Advanced Electrical
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level II
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12
Rules 2002	● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Workplace Specialist: Industrial Technology or Industrial Electronics ● Technology Education
REPA/REPA 3	● CTE: Trade & Industrial: Building Trades 5-12 ● CTE: Trade & Industry: Electrician 5-12 ● Workplace Specialist: Electrical 9-12 ● Workplace Specialist: Industrial Technology or Industrial Electronics 9-12 ● Technology Education 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BCTI 231: Intermediate Electrical, Part 1; BCTI 232: Intermediate Electrical, Part 2; BCTI 101: Intro to Carpentry, Part 1; BCTI 102: Intro to Carpentry, Part 2; BCTI 280: Co-Op/ Internship BCTI 231: Intermediate Electrical Part 1, BCTI 232: Intermediate Electrical Part 2
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Carpentry Specialist (46.0415), TC Carpentry Specialist (46.0415)
Liberal Arts/Sciences Requirements	

Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Intermediate Electrical***
7263.D1.1	Explain how to calculate branch circuit and feeder loads for residential and commercial applications.
7263.D1.2	Discuss the factors involved in conductor selection, including insulation types, current-carrying capacity, temperature ratings, and voltage drop.
7263.D1.3	Describe specific types of incandescent, fluorescent, and HID lamps, as well as ballasts. Examine troubleshooting and various types of lighting controls.
7263.D1.4	Investigate the NEC® requirements for equipment installed in hazardous locations.
7263.D1.5	Explain how to size and select circuit breakers and fuses for various applications. Discuss short circuit calculations and troubleshooting.
7263.D1.6	Discuss switchboards and switchgear, including installation, grounding, and maintenance requirements. Examine electrical blueprints.
7263.D1.7	Discuss transformer types, construction, connections, protection, and grounding.
7263.D1.8	Describe the components, installation considerations, and NEC® requirements for commercial services.
7263.D1.9	Examine calculations required to size conductors and overcurrent protection for motor applications.
7263.D1.10	Demonstrate installation, termination, and testing of voice, data, and video cabling systems.
7263.D1.11	Explain the selecting, sizing, and installing motor controllers. Investigate control circuit pilot devices and basic relay logic.
7263.D1.12	Attain readiness to take the NCCER Electrical Level 3 certifications exams.
Domain	***General Carpentry***
7263.D2.1	Review the history of the trade, describe the apprentice program, identify career opportunities for carpentry and construction workers, and list the skills, responsibilities, and characteristics a worker should possess. Discuss the importance of safety in the construction industry.
7263.D2.2	Categorize the building materials used in construction work, including lumber, sheet materials, engineered wood products, structural concrete, and structural steel. Describe the fasteners and adhesives used in construction work. Discuss the methods of squaring a building.
7263.D2.3	Provide descriptions of hand tools and power tools used by carpenters. Demonstrate safe and proper operation, as well as care and maintenance.
7263.D2.4	Apply the techniques for reading and using construction drawings and specifications with an emphasis on drawings and information relevant to the carpentry trade. Generate quantity takeoffs.
7263.D2.5	Examine framing basics and the procedures for laying out and constructing a wood floor using common lumber, as well as engineered building materials.
7263.D2.6	Describe procedures for laying out and framing walls, including roughing-in door and window openings, constructing corners, partition Ts, and bracing walls. Follow the procedure to estimate the materials required to frame walls.

7263.D2.7	Describe types of roofs and list instructions for laying out rafters for gable roofs, hip roofs, and valley intersections. Compare stick-built and truss-built roofs. List the basics of roof sheathing installation.
7263.D2.8	Investigate the concept of the building envelope and explain its components. Describe types of windows, skylights, and exterior doors, and list instructions for installation.
7263.D2.9	Compare types of stairs and common building code requirements related to stairs. Examine techniques for measuring and calculating rise, run, and stairwell openings, laying out stringers, and fabricating basic stairways.
7263.D2.10	Attain readiness to take NCCER Carpentry Level I certification exams.
7263.D2.11	Understand the application of conventional fiberglass/asphalt roof shingles.
7263.D2.12	Apply carpentry skills, methods, and techniques to lab and/or on-the-job settings.
Domain	***WBL***
7263.D3.1	Gain practical experience on the job.
7263.D3.2	Think critically and independently, analyze, synthesize, and evaluate technical problems and information.
7263.D3.3	Identify and interpret health, safety, and welfare standards as dictated by local, state or federal agencies.

Construction Heating, Ventilation, and Air Conditioning (HVAC)							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7131	Principles of HVAC	7125	HVAC Fundamentals	7126	HVAC Service	7244	HVAC Capstone

Principles of Heating, Ventilation, and Air Conditioning (HVAC)		
Career Cluster	Construction	
Program of Study	HVAC	
NLPS Sequence	A	
Course Code	7131	
Course Description	*Principles of Heating, Ventilation and Air Conditioning (HVAC) covers many of the topics needed for students to be successful in the mechanical construction industry. Its modules include history of HVAC industry, OSHA 10-hour construction industry training, communication and customer service skills. This course will also cover basic electricity concepts.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Heating & Air Conditioning K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Heating & Air Conditioning 9-12 ● Occupational Specialist I, II or III: Heating & Air Conditioning 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR) ● Workplace Specialist: Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR) ● Technology Education	
REPA/REPA 3	● CTE: Trade & Industrial Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR) 5-12 ● Workplace Specialist: HVAC 9-12	

	● Technology Education 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HVAC 100: Intro to HVAC Technology, BCTI 130: Introduction to Electrical
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Heating, Ventilation, and Air Conditioning (47.0201), TC Heating, Ventilation and Air Conditioning (47.0201)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, COMM 104: Workplace Communications, IVYT 113: Student Success in Technology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***HVAC Basics***
7131.D1.1	Investigate the earliest uses of refrigeration and heating equipment and the inventors that developed them.
7131.D1.2	Discuss current employment opportunities in the mechanical construction industry and understand the qualifications required for employment.
7131.D1.3	Comply with OSHA-10 training requirements and understand the safety obligations of workers, supervisors, and managers to ensure a safe workplace.
7131.D1.4	Discuss the causes and results of accidents and the impact of accident costs.
7131.D1.5	Define safe work procedures, proper use of personal protective equipment, and working with hazardous chemicals.
7131.D1.6	Demonstrate ability to understand various elements used in commercial and residential blueprints.
7131.D1.7	Identify the types of architectural lines, symbols, notations, and abbreviations used in print reading.
7131.D1.8	Identify types of drawings such as elevation views, section views, detail views, and construction materials.
7131.D1.9	Practice techniques for communicating effectively with customers, co-workers and supervisors.
7131.D1.10	List examples that emphasize the importance of verbal and written information and instructions on the job.
7131.D1.11	Attain readiness to take the OSHA 10 Certification exam.
Domain	***Basic Electrical***
7131.D2.1	Describe the electrical trade and discuss the career paths available to electricians.
7131.D2.2	Discuss safety rules and regulations for electricians, including precautions for electrical hazards found on the job. Examine the OSHA-mandated lockout/tagout procedure.

7131.D2.3	Explain electrical concepts used in Ohm's law applied to DC series circuits. Discuss atomic theory, electromotive force, resistance, and electric power equations.
7131.D2.4	Analyze series, parallel, and series-parallel circuits. Examine resistive circuits, Kirchhoff's voltage and current laws, and circuit analysis.
7131.D2.5	Examine and use the NEC®. Describe the layout and the types of information found within the code book. Practice finding information using easy-to-follow procedures.
7131.D2.6	Identify the hardware and systems used by an electrician to mount and support boxes, receptacles, and other electrical components. Examine NEC® fill and pull requirements for device, pull, and junction boxes under 100 cubic inches.
7131.D2.7	Describe conduit bending and installation. Demonstrate the techniques for using hand-operated and step conduit benders, as well as cutting, reaming, and threading conduit.
7131.D2.8	List the types and applications of raceways, wireways, and ducts. Investigate the appropriate NEC® requirements.
7131.D2.9	Describe the types and applications of conductors and demonstrate proper wiring techniques. Investigate the appropriate NEC® requirements.
7131.D2.10	Examine electrical prints, drawings, and symbols, and the types of information that can be found on schematics, one-lines, and wiring diagrams.
7131.D2.11	Investigate the electrical devices and wiring techniques common to residential construction and maintenance. Perform service calculations. Investigate the appropriate NEC® requirements.
7131.D2.12	Demonstrate proper selection, inspection, and use of common electrical test equipment, including voltage testers, clamp-on ammeters, ohmmeters, multimeters, phase/motor rotation testers, and data recording equipment. Describe safety precautions and meter category ratings.
7131.D2.13	Attain readiness to take NCCER Electrical Level I certification exams.
Domain	***Career Navigation***
7131.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7131.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7131.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7131.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7131.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7131.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7131.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7131.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7131.D5.1	Demonstrate computer literacy skills and basic computer functions.

7131.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7131.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7131.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

HVAC Fundamentals		
Career Cluster	Construction	
Program of Study	HVAC	
NLPS Sequence	B	
Course Code	7125	
Course Description	*HVAC Fundamentals introduces fundamentals applicable to the heating and refrigeration phases of air conditioning. Includes types of units, parts, basic controls, functions, and applications. Emphasizes practices, tool and meter use, temperature measurement, heat flow, the combustion process and piping installation practices. Covers the basic sequence of operation for gas, oil and electric furnaces. Introduction to compression systems used in mechanical refrigeration including the refrigeration cycle and system components. Introduces safety procedures, proper use of tools used to install and service refrigeration equipment, refrigerant charging and recovery, system evacuation, calculating superheat and subcooling and using a refrigerant temperature/pressure chart. This course will use lecture, lab and online simulation to prepare students for the nationally recognized certification exam as part of the outcome assessment learning objectives.*	
Prerequisite(s)/ Corequisite(s)	Principles of HVAC	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Heating & Air Conditioning K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Heating & Air Conditioning 9-12 ● Occupational Specialist I, II or III: Heating & Air Conditioning 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR)	

	● Workplace Specialist: Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR) ● Technology Education
REPA/REPA 3	● CTE: Trade & Industrial Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR) 5-12 ● Workplace Specialist: HVAC 9-12 ● Technology Education 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HVAC 101: Heating Fundamentals, HVAC 103: Refrigeration I
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Heating, Ventilation, and Air Conditioning (47.0201), TC Heating, Ventilation and Air Conditioning (47.0201)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, COMM 104: Workplace Communications, IVYT 113: Student Success in Technology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Heating Fundamentals***
7125.D1.1	Demonstrate safe practices and procedures.
7125.D1.2	Define and properly use the terminology of the heating industry.
7125.D1.3	Identify and explain the operation of safety devices and components used on heating equipment that were covered in the course.
7125.D1.4	Explain the combustion and heating process of a fossil fuel furnace.
7125.D1.5	Describe the sequence of operation for the furnace types covered in the course.
7125.D1.6	Demonstrate the use of the tools, test equipment and materials used in heating equipment installation and service that were covered in this course.
7125.D1.7	Explain the basics concepts of low voltage thermostatic control.
7125.D1.8	Discuss the characteristics of fuels and the safety precautions for working with those fuels.
7125.D1.9	Measure the temperature rise across a furnace's heat exchanger.
7125.D1.10	Identify common electrical schematic symbols used in furnace schematics.
7125.D1.11	Identify the different ignition systems used on gas furnaces.
7125.D1.12	Explain how to measure manifold gas pressure.
7125.D1.13	Describe the various methods of proving flames used on gas and oil furnaces that were covered in the course.
Domain	***Refrigeration Fundamentals***
7125.D2.1	Demonstrate safe practices and procedures with tools, refrigerants, torches, and test equipment covered in the course.

7125.D2.2	Define key terms associated with refrigeration such as superheated refrigerant, sub cooled refrigerant, and saturated refrigerant.
7125.D2.3	Identify the basic components of mechanical refrigeration systems that were covered in the course.
7125.D2.4	Describe the basic refrigeration cycle identifying where the refrigerant is superheated, subcooled, saturated, under high pressure, and under low pressure.
7125.D2.5	Use a temperature/pressure chart to determine saturation temperatures and pressures.
7125.D2.6	Using data supplied, calculate/determine superheat, subcooling, evaporator coil TD, evaporator coil, T condenser split, saturated suction temperature and condensing temperature. [TD = EAT – BP where EAT is evaporator entering air temperature and BP is refrigerant boiling point temperature in the evaporator; T = EAT – LAT where EAT is the evaporator's entering air temperature and LAT is the evaporator's leaving air temperature].
7125.D2.7	Explain the basic principles of heat transfer.
7125.D2.8	Demonstrate the proper use of refrigeration tools introduced in the course.
7125.D2.9	Demonstrate the fluxing, brazing, and/or soldering, flaring and swaging techniques introduced in the course.
7125.D2.10	Describe the operation/function of compressors, metering devices, condensers, and evaporators.
7125.D2.11	Describe the use of vacuum pumps, manifold gauges, and refrigerant recovery/recycling equipment.
7125.D2.12	Explain the basics of ozone depletion, the link between refrigerants and ozone depletion and the effects of ozone depletion.
7125.D2.13	Attain readiness to take the Esco EPA 608 Reclamation Certification exam.
7125.D3.1	Demonstrate how to pressurize a system with nitrogen, install gauges, properly evacuate a system, and read a micron gauge.

HVAC Service	
Career Cluster	Construction
Program of Study	HVAC
NLPS Sequence	C
Course Code	7126
Course Description	*HVAC Service continues the study of air conditioning and refrigeration along with the procedures used to analyze mechanical and electrical problems encountered when servicing heating systems. Students will better understand compressors, metering devices, system recharging, refrigerant recovery, basics of motor types, equipment installation and troubleshooting practices as they apply to air conditioning and refrigeration systems. Additionally, students will be able to understand electrical schematics and connection diagrams, combustion testing, venting and combustion air requirements, sequence of operation, heating controls, troubleshooting techniques, installation practices, basic codes applying to furnace codes, and service procedures. This course will use lecture, lab and online simulation to prepare students for the nationally recognized certification exam as part of the*

	outcome assessment learning objectives.
Prerequisite(s)/ Corequisite(s)	Principles of HVAC; HVAC Fundamentals
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level I
Bulletin 400	● Standard Trade & Industrial: Heating & Air Conditioning K-12 ● Industrial Arts 7-12, K-12
Rules 46-47	● Standard Trade & Industrial: Heating & Air Conditioning 9-12 ● Occupational Specialist I, II or III: Heating & Air Conditioning 9-12 ● Industrial Technology K-12 ● Industrial Education K-12
Rules 2002	● CTE: Trade & Industrial: Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR) ● Workplace Specialist: Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR) ● Technology Education
REPA/REPA 3	● CTE: Trade & Industrial Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR) 5-12 ● Workplace Specialist: HVAC 9-12 ● Technology Education 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HVAC 202: Electrical Circuits and Controls, HVAC 211: Refrigeration II
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Heating, Ventilation, and Air Conditioning (47.0201), TC Heating, Ventilation, and Air Conditioning (47.0201)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, COMM 104: Workplace Communications, IVYT 113: Student Success in Technology
Promoted Certifications	NCCER – HVAC – Level 1
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Electrical Circuits and Controls***
7126.D1.1	Demonstrate safe practices and procedures.

7126.D1.2	Describe the operation of the individual controls identified in the course and explain how they are typically used in control systems.
7126.D1.3	Effectively read and use schematic and pictorial wiring diagrams commonly found on residential and light commercial heating, air conditioning equipment.
7126.D1.4	Wire a simple control system for a residential or light commercial heating and/or air conditioning system while using the appropriate wiring diagrams.
7126.D1.5	Draw pictorial and schematic wiring diagrams for equipment.
7126.D1.6	Troubleshoot electrical control systems.
7126.D1.7	Perform tasks as assigned in a professional manner.
7126.D1.8	Program basic electronic heating/cooling thermostats.
7126.D1.9	Install field control wiring for typical residential and light commercial HVAC systems.
7126.D1.10	Explain the difference between pilot duty and line duty controls.
7126.D1.11	Recognize common controls used on residential and light commercial HVAC equipment covered in the class.
7126.D1.12	Draw the typical schematic symbols used in HVAC/R work.
7126.D1.13	Attain readiness to take the ESCO HVAC Excellence Employment Ready Exam.
Domain	***Refrigeration Service***
7126.D2.1	Identify and correctly locate on a system the air conditioning and refrigeration system components normally found in residential and light commercial A/C systems.
7126.D2.2	Describe the proper operation and function of system components covered in the course.
7126.D2.3	Identify the most common types of system component failure and the effect each has on the performance of the system.
7126.D2.4	Using manifold gauges, pressure/temperature charts, and thermometers, determine the following for a refrigeration system: superheat, subcooling, evaporator coil TD, evaporator coil DT, condensing temperature, saturated suction temperature and condenser split.
7126.D2.5	Apply the basic refrigeration cycle and a refrigerant temperature/pressure chart to analyze and troubleshoot A/C and/or refrigeration systems.
7126.D2.6	Recover refrigerants; evacuate systems, leak check and field charge systems using the methods covered in the course.
7126.D2.7	Outline the basics of electrical control of residential A/C systems.
7126.D2.8	Identify the different single-phase motor types used in HVAC/R systems and their applications.
7126.D2.9	Describe motor starting components, their application and how they work.
7126.D2.10	Describe electrical troubleshooting techniques for compressor motors, fan motors, and their associated starting components.
7126.D2.11	Describe how changes in evaporator loading will affect the system.
7126.D2.12	Describe the effect on the system from the common system problems such as undercharging, dirty condensers, low evaporator airflow, etc.
7126.D2.13	Safely perform assigned tasks following lab safety regulations.
7126.D2.14	Attain readiness to take the ESCO HVAC Excellence Employment Ready Exam.

HVAC Capstone		
Career Cluster	Construction	
Program of Study	HVAC	
NLPS Sequence	D	
Course Code	7244	
Course Description	*The HVAC Capstone course covers procedures used to analyze mechanical and electrical problems encountered when servicing heating systems. Topics include electrical schematics and connection diagrams, combustion testing, venting and combustion air requirements, sequence of operation, heating controls, troubleshooting techniques, installation practices, basic codes applying to furnace codes, and service procedures. Students may also have the opportunity to gain an understanding of Heat Pump Systems or to develop skills needed to fabricate and install duct work. This course will use lecture, lab and online simulation to prepare students for the nationally recognized certification exam as part of the outcome assessment learning objectives.*	
Prerequisite(s)/ Corequisite(s)	Principles of HVAC; HVAC Fundamentals; HVAC Service	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Standard Trade & Industrial: Heating & Air Conditioning K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Heating & Air Conditioning 9-12 ● Occupational Specialist I, II or III: Heating & Air Conditioning 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR) ● Workplace Specialist: Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR) ● Technology Education	
REPA/REPA 3	● CTE: Trade & Industrial Heating, Ventilation, Air Conditioning, & Refrigeration (HVACR) 5-12 ● Workplace Specialist: HVAC 9-12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HVAC 208: Heating Service; HVAC 107: Duct Fabrication and Installation *OR* HVAC 205: Heat Pump Systems*	

VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Heating, Ventilation, and Air Conditioning (47.0201); TC Heating, Ventilation and Air Conditioning (47.0201)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, COMM 104: Workplace Communications, IVYT 113: Student Success in Technology
Promoted Certifications	NCCER – HVAC – Level 2

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Heating Service***
7244.D1.1	Demonstrate safe practices and procedures.
7244.D1.2	Find pertinent installation information in a furnace installation manual.
7244.D1.3	Adjust blower speed to meet manufacturer's specifications for temperature rise across the furnace's heat exchanger.
7244.D1.4	Describe fuel piping, combustion air and venting requirements for gas and oil furnaces.
7244.D1.5	Identify the common controls used on heating appliances covered in the course.
7244.D1.6	Explain the function of the common heating controls covered in the course.
7244.D1.7	Explain how the different gas and oil ignition systems work.
7244.D1.8	Perform basic troubleshooting tests on a furnace.
7244.D1.9	Demonstrate the use of common test equipment required in heating service work.
7244.D1.10	Read an electrical schematic for a furnace.
7244.D1.11	List basic code requirements pertaining to furnace installations covered in the course.
7244.D1.12	Describe the different venting requirements between atmospheric furnaces, 78-80% fan assisted furnaces, and 90% induced draft furnaces.
7244.D1.13	Outline typical sequences of operation for furnace types covered in the course.
7244.D1.14	Formulate a "clean and check" preventative maintenance procedure for furnace.
7244.D1.15	Attain readiness to take the ESCO HVAC Excellence Employment Ready Exam.
Domain	***Duct Fabrication***
7244.D2.1	Demonstrate safe practices and procedures.
7244.D2.2	Develop neat and clean shop drawings to scale.
7244.D2.3	Read and interpret schedules, drawings and specifications shown on construction drawings to formulate a material list.
7244.D2.4	Layout and calculate measurements for duct work are used in heating and air conditioning using mechanical drawings.
7244.D2.5	Demonstrate the use of hand tools used in sheet metal fabrication and duct installation.
7244.D2.6	Demonstrate use of sheet metal shop equipment.
7244.D2.7	Demonstrate proper installation practices.
Domain	***Heat Pump Systems***
7244.D3.1	Demonstrate safe practices and procedures.

7244.D3.2	Interpret and utilize pictorial and schematic diagrams.
7244.D3.3	Identify different types of heat pumps in relation to their source of heat.
7244.D3.4	Diagram refrigerant flows through a heat pump in both the heating and cooling mode identifying refrigerant condition and pressures.
7244.D3.5	Explain in detail the defrost cycle of the air-to-air heat pump.
7244.D3.6	Identify and troubleshoot electrical control system components covered in this course.
7244.D3.7	Identify and troubleshoot common refrigeration system components covered in this course.
7244.D3.8	Explain the different methods for checking refrigerant charge and charging heat pumps covered in this course.
7244.D3.9	Describe the typical thermostats used with heat pumps.
7244.D3.10	Explain the need and types of auxiliary heat.
7244.D3.11	Given the heat loss and heat gain of a structure, size a heat pump and back-up electric heat.
7244.D3.12	Outline typical heat pump control technique.
7244.D3.13	Compare and contrast the different types of heat pumps: air-to-air, ground source and closed-loop water source heat pumps.
7244.D3.14	Attain readiness to take the ESCO HVAC Excellence Employment Ready Exam.

Construction Heavy Equipment Operations							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7130	Principles of Construction Trades	7290	Heavy Equipment Fundamentals	7291	Advanced Heavy Equipment Operations	7292	Heavy Equipment Capstone

Principles of Construction Trades		
Career Cluster	Construction	
Program of Study	Heavy Equipment Operations	
NLPS Sequence	A	
Course Code	7130	
Course Description	*Principles of Construction Trades prepares students with the basic skills needed to continue in a construction trade field. Topics will include an introduction to the types and uses for common hand and power tools, learn the types and basic terminology associated with construction drawings, and basic safety. Additionally students will study the roles of individuals and companies within the construction industry and reinforce mathematical and communication skills necessary to be successful in the construction field.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist: Building Trades ● Workplace Specialist in related course approved for a CTE pathway	

REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade and Industrial: Building Trades 5-12 ● Workplace Specialist: Construction 9-12 ● Workplace Specialist: Building Trades 9-12 ● Workplace Specialist in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BCTI 100: Introduction to Construction Technology
VU Course Alignment	CNST 100: Construction Seminar, CNST 120: Construction Safety
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Carpentry Specialist (46.0415), TC Carpentry Specialist (46.0415) VU - CG Construction Carpenter Assistant (46.0000)
Liberal Arts/Sciences Requirements	ITCC - MATH 122: Applied Technical Mathematics, COMM 104: Workplace Communications, IVYT 113: Student Success in Technology VU - ENGL 101: English Composition I, MATH 100+ level or higher,
Promoted Certifications	NCCER Core Certification
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Construction Trades***
7130.D1.1	Comply with OSHA-10 training requirements. Explain the safety obligations of workers, supervisors, and managers to ensure a safe workplace.
7130.D1.2	Review basic mathematical functions and explain their applications to the construction trades.
7130.D1.3	Identify and explain specific applications of hand tools that are widely used in the construction industry, such as hammers, saws, levels, pullers, and clamps.
7130.D1.4	Provide detailed descriptions of commonly used power tools, such as drills, saws, grinders, and sanders. Review applications, proper use, safety, and maintenance. Demonstrate power tool use in on-the-job settings.
7130.D1.5	Discuss basic terms for construction drawings, components, and symbols. Explain the different types of drawings and interpret and use drawing dimensions.
7130.D1.6	Explain how ropes, chains, hoists, loaders, and cranes are used to move material and equipment from one location to another on a job site.
7130.D1.7	Identify the roles of individuals and companies in the construction industry.
7130.D1.8	Recognize hazards associated with materials handling and explain proper materials handling techniques and procedures.
Domain	***Construction Industry***
7130.D2.1	Recognize direct job opportunities in the - construction field.
7130.D2.2	Recognize indirect job opportunities in the -construction field.
7130.D2.3	Become familiar with new residential building products.
7130.D2.4	Understand the connection between residential construction and related fields.
7130.D2.5	Understand the importance of safety training and education in the construction industry.

7130.D2.6	Understand the relationship between worker's compensation insurance and safety record.
7130.D2.7	Understand and appreciate the roles that OSHA and INSafe play in the construction industry.
7130.D2.8	Understand the hazards involved in the residential construction industry.
7130.D2.9	Understand basic drafting/drawing techniques and how to apply them to - working drawings.
7130.D2.10	Understand the relationship between individual building components and a structure as a whole.
7130.D2.11	Utilize different resources to understand building component's applications and their limitations.
7130.D2.12	Understand basic print reading for the construction industry.
Domain	***Career Navigation***
7130.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7130.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7130.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7130.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7130.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7130.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7130.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7130.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7130.D5.1	Demonstrate computer literacy skills and basic computer functions.
7130.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7130.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7130.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Heavy Equipment Fundamentals	
Career Cluster	Construction
Program of Study	Heavy Equipment Operations
NLPS Sequence	B
Course Code	7290

Course Description	*Heavy Equipment Fundamentals orients students to the Heavy Equipment industry and the basics operational techniques required to be a Heavy Equipment Operator. Topics include safety, identification of heavy equipment, utility tractors, earthmoving and grades. This course prepares students for the NCCER Heavy Equipment Level 1 certification.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Technology Education	
REPA/REPA 3	● CTE: Trade & Industrial Building Trades 5-12 ● Workplace Specialist: Heavy Equipment 9-12 ● Technology Education 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications	NCCER Heavy Equipment Operator Level 1	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	

Domain	***Orientation to the Trade***
7290.D1.1	Explain the basic terminology, types, and uses of equipment
7290.D1.2	Identify career opportunities available to construction equipment operators and explain the purpose and objectives of an apprentice training program
7290.D1.3	Explain the responsibilities and characteristics of a good operator
Domain	***Heavy Equipment Safety***
7290.D2.1	Explain the importance of construction equipment safety
7290.D2.2	Describe preventive maintenance procedures
7290.D2.3	Explain the importance of safety when working with construction equipment
7290.D2.4	State the purpose of signs, tags, barricades, and lockout/tagout devices used on construction sites
7290.D2.5	Describe the long- and short-term health effects, first-aid measures, handling, and storage, and/or required personal protective equipment (PPE)
7290.D2.6	Identify safeguards used in a highway construction work zone
7290.D2.7	State the general guidelines for a safe operation, maintenance, and transportations of construction equipment
7290.D2.8	Explain the dangers of working around an excavation area with construction equipment
7290.D2.9	Describe the importance of safety Data Sheets (SDS)
Domain	***Basic Operational Techniques***
7290.D3.1	Identify the components of forklifts
7290.D3.2	Explain the operations of various components
7290.D3.3	Identify the various types of on-road dump trucks
7290.D3.4	Identify and describe instruments and specialized control systems in dump trucks
7290.D3.5	Explain safe driving practices for dump trucks
7290.D3.6	Perform basic operations using a dump truck
7290.D3.7	Identify and describe the components of a skid loader
7290.D3.8	Describe the prestart inspection requirements for skid loader
7290.D3.9	Describe startup, shutdown, and operations procedures for a skid loader
7290.D3.10	Identify and describe the functions of various components of equipment
7290.D3.11	Describe prestart inspection requirements for various pieces of machinery
Domain	***Utility Tractors***
7290.D4.1	Describe preventive maintenance procedures.
7290.D4.2	Describe startup and operating procedures for forklift.
7290.D4.3	List the operator inspection and maintenance requirements.
Domain	***Introduction to Earthmoving***
7290.D5.1	Describe earthmoving operations.
7290.D5.2	Identify and explain soil stabilization methods.
7290.D5.3	Layout a basic earthmoving operation.
7290.D5.4	Identify the best equipment for performing a given earthmoving operation.
Domain	***Identification of Heavy Equipment***
7290.D6.1	Describe the equipment and methods used in excavating.

Domain	Grades
7290.D7.1	Explain the planning process for grading.
7290.D7.2	Describe the electronic equipment and systems used in site measurement and grading.
7290.D7.3	Explain how to mark and set grade stakes.
7290.D7.4	Explain how to make horizontal and vertical measurements.
7290.D7.5	Explain how to establish and check finish grade.

Advanced Heavy Equipment Operations		
Career Cluster	Construction	
Program of Study	Heavy Equipment Operations	
NLPS Sequence	C	
Course Code	7291	
Course Description	*Advanced Heavy Equipment Operations builds upon the earthmoving knowledge learned in Heavy Equipment Fundamentals. Students will gain the necessary skills and knowledge regarding soils, excavation math, and interpreting Civil Drawings to be able to prepare a site. Additionally students will learn to operate scrapers used in site preparation. This course will prepare students for the first half of the NCCER Heavy Equipment Operations Level 2.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Heavy Equipment Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Technology Education	
REPA/REPA 3	● CTE: Trade & Industrial Building Trades 5-12 ● Workplace Specialist: Heavy Equipment 9-12 ● Technology Education 5-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	NCCER Heavy Equipment Operator Level 2

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Rough-Terrain Forklifts***
7291.D1.1	Identify and describe the components of a rough terrain forklift.
7291.D1.2	Describe the prestart inspection requirements for a rough terrain forklift.
7291.D1.3	Operate a forklift safely.
7291.D1.4	Perform preventive maintenance procedures and explain the operations of various components.
7291.D1.5	Demonstrate proper startup and operating procedures for forklift.
Domain	***On-Road Dump Trucks***
7291.D2.1	Review the various types of on-road dump trucks.
7291.D2.2	Review the requirements of a CDL for on road dump truck operation.
7291.D2.3	Understand the use of instruments and specialized control systems in dump trucks.
7291.D2.4	List the operator inspection and maintenance requirements for on road dump truck.
7291.D2.5	Demonstrate safe driving practices for dump trucks.
7291.D2.6	Perform basic operations using a dump truck.
Domain	***Skid Steers***
7291.D3.1	Operate a skid loader safely.
7291.D3.2	Demonstrate the prestart inspection requirements for skid steer.
7291.D3.3	Describe the preventive maintenance requirements for a skid steer.
7291.D3.4	Demonstrate startup, shutdown, and operations procedures for a skid steer
Domain	***Site Work***
7291.D4.1	Explain and demonstrate the correct use of formulas for site layout.
7291.D4.2	Understand the different types of sites and conditions (e.g. building site, highway site, etc.) and how they differ.
7291.D4.3	Describe methods used to control water on job sites.
7291.D4.4	Explain how grades are established on a job site.

Domain	***Excavation Math***
7291.D5.1	Understand the proper sequence of operations in a formula.
7291.D5.2	Demonstrate understanding of different types of angles.
7291.D5.3	Explain how math is used to calculate how math is used to solve right triangles.
7291.D5.4	Demonstrate how to calculate/estimate area and volume.
Domain	***Interpreting Civil Drawings***
7291.D6.1	Analyze types of drawings and prints used in equipment operations.
7291.D6.2	Demonstrate the ability to read and interpret drawing.
7291.D6.3	Define common abbreviations.
7291.D6.4	Explain the purpose of the plan specifications for projects.
7291.D6.5	Describe how as-built drawings are prepared.
7291.D6.6	Explain the purpose of site safety associated with grading work.
7291.D6.7	Describe types of drawings and prints used in equipment operations.
7291.D6.8	Read and interpret drawings.
7291.D6.9	Define common abbreviations.
7291.D6.10	Describe how as-built drawings are prepared.

Heavy Equipment Capstone		
Career Cluster	Construction	
Program of Study	Heavy Equipment Operations	
NLPS Sequence	D	
Course Code	7292	
Course Description	*Heavy Equipment Capstone will cover the second part of NCCER Heavy Equipment Level 2 and all of Level 3. Students will learn to operate Loaders, Skid Steers, Rough Terrain Forklifts, Backhoes and Dozers.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Heavy Equipment Fundamentals; Advanced Heavy Equipment Operations	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12	

	● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12
Rules 2002	● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Technology Education
REPA/REPA 3	● CTE: Trade & Industrial Building Trades 5-12 ● Workplace Specialist: Heavy Equipment 9-12 ● Technology Education 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	NCCER Heavy Equipment Operator Level 3
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Finishing and Grading***
7292.D1.1	Describe grading and installation practices for pipe laying operations.
7292.D1.2	Describe the different types and characteristics of soils.
7292.D1.3	Describe the factors that affect soil excavation.
7292.D1.4	Describe working in various soil conditions.
7292.D1.5	Identify and describe components of a scraper.
7292.D1.6	Describe the prestart inspection and preventive maintenance requirements for a scraper.
7292.D1.7	Describe the startup, shutdown, and operating procedures for a scraper.
7292.D1.8	Describe the types of equipment used for finish grading.
7292.D1.9	Explain methods used to stabilize soils and control soil erosion.
7292.D1.10	Describe finish grading methods.
Domain	***Backhoes***
7292.D2.1	Identify and describe components of a loader.
7292.D2.2	Describe the prestart inspection and preventive maintenance requirements for a loader.

7292.D2.3	Describe the startup, shutdown, and operating procedures for a loader.
7292.D2.4	Identify and describe common uses and types of backhoes.
7292.D2.5	Identify and describe the components, controls, and attachments on a typical backhoe.
7292.D2.6	Identify and describe safety, inspection, and service guidelines associated with a backhoe.
7292.D2.7	Describe basic operating procedures for a backhoe.
7292.D2.8	Identify and describe common work activities for a backhoe.
7292.D2.9	Perform basic backhoe maneuvers and setting up a backhoe using stabilizers
Domain	***Compaction Equipment***
7292.D3.1	Identify and describe types of compaction equipment.
7292.D3.2	Identify and describe the components, controls, and attachments on a typical compactor.
7292.D3.3	Describe safety guidelines and basic preventive maintenance requirements associated with compaction equipment.
7292.D3.4	Describe basic procedures for operating a compactor.
7292.D3.5	Describe factors involved in work activities associated with a compactor.
Domain	***Off-Road Dump Trucks***
7292.D4.1	Identify and describe basic types, uses, and components of off-road dump trucks.
7292.D4.2	Identify and describe safety, inspection, and service guidelines associated with off-road dump trucks.
7292.D4.3	Describe and complete basic startup and operating procedures for off-road dump trucks.
Domain	***Dozers***
7292.D5.1	Identify and describe basic types, uses, and components of a dozer.
7292.D5.2	Identify and describe safety, inspection, and service guidelines associated with a dozer.
7292.D5.3	Describe and complete basic startup and operating procedures for a dozer.
Domain	***Excavators***
7292.D6.1	Identify and describe basic types, uses, and components of excavators.
7292.D6.2	Identify and describe safety, inspection, and service guidelines associated with an excavator.
7292.D6.3	Describe and complete basic startup and operating procedures for track mounted hydraulic excavator.
Domain	***Motor Grades***
7292.D7.1	Identify and describe uses and components of a motor grader.
7292.D7.2	Identify and describe safety, inspection, and service guidelines associated with a motor grader.
7292.D7.3	Describe basic startup and operating procedures for a motor grader.

Construction Plumbing and Pipefitting							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7133	Principles of Plumbing and Pipefitting	7129	Plumbing and Pipefitting Fundamentals	7120	Advanced Plumbing and Pipefitting	7264	Plumbing and Pipefitting Capstone

Principles of Plumbing and Pipefitting		
Career Cluster	Construction	
Program of Study	Plumbing and Pipefitting	
NLPS Sequence	A	
Course Code	7133	
Course Description	*Principles of Plumbing and Pipefitting covers much of the NCCER Level I curriculum for Plumbing and is a prerequisite to future plumbing courses. Its modules cover topics such as an introduction to the plumbing profession, basic safety, tools used in the plumbing trade, an introduction to plumbing drawings, and all basic skills needed to continue education in the plumbing program.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Technology Education	
REPA/REPA 3	● CTE: Trade & Industrial Building Trades 5-12 ● CTE: Trade & Industrial: Plumbing & Pipefitting 5-12	

	● Technology Education 5-12 ● Workplace Specialist: Construction Trades 9-12 ● Workplace Specialist: Plumbing & Pipefitting 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BCTI 150: Introduction to Plumbing, Part 1; BCTI 151: Introduction to Plumbing, Part 2
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Plumbing Part 1***
7133.D1.1	Examine the many career options available in today's plumbing profession. Investigate the history of plumbing and discuss the current technology, industries, and associations that make up the modern plumbing profession. Review human relations and safety skills.
7133.D1.2	Discuss the causes of accidents and their consequences and repercussions in terms of delays, increased expenses, injury, and loss of life. Review the types and proper use of personal protective equipment (PPE). Describe the use of critical safety information conveyed in hazard communication (HazCom), safety signs, signals, lockout/tagout, and emergency response. Explain confined-space safety, and review safety issues related to hand and power tools.
7133.D1.3	Demonstrate the care and use of the different types of hand and power tools used on the job. Select the appropriate tools for different tasks, and review tool maintenance and safety issues.
7133.D1.4	Discuss basic math concepts, such as whole numbers, fractions, decimals, and squares, and demonstrate how they apply to on-the-job situations. Describe how to measure pipe using fitting tables and framing squares and how to calculate 45-degree offsets.
7133.D1.5	Navigate the different types of plumbing drawings encountered on the job and discuss how to interpret and apply them when laying out and installing plumbing systems. Discuss the symbols used in plumbing and mechanical drawings and review isometric, oblique, orthographic, as well as schematic drawings. Render plumbing drawings and recognize how code requirements apply to plumbing drawings.
7133.D1.6	Describe the different types of plastic pipe and fittings used in plumbing applications, including ABS, PVC, CPVC, PE, PEX, and PB. Demonstrate how to measure, cut, join, and support plastic pipe according to manufacturer's instructions and applicable codes. Discuss pressure testing of plastic pipe once installed.
7133.D1.7	Attain readiness to take the first half of NCCER Plumbing Level I certification exams.
Domain	***Introduction to Plumbing Part 2***

7133.D2.1	Discuss sizing, labeling, and applications of copper pipe and fittings and review the types of valves that can be used on copper pipe systems. Explain proper methods for cutting, joining, and installing copper pipe. Examine insulation, pressure testing, seismic codes, and handling and storage requirements.
7133.D2.2	Examine hub-and-spigot and no-hub cast-iron pipe and fittings and their applications in DWV systems. Discuss material properties, storage and handling requirements, and fittings and valves. Demonstrate joining methods, installation, and testing.
7133.D2.3	Discuss threading, labeling, and sizing of steel pipe and compare the differences between domestic and imported pipe. Demonstrate the proper techniques for measuring, cutting, threading, joining, and hanging steel pipe. Examine corrugated stainless-steel tubing.
7133.D2.4	Discuss the proper applications of code-approved fixtures in plumbing installations. Examine the different types of fixtures and the materials used in them. Investigate storage, handling, and code requirements.
7133.D2.5	Describe how DWV systems remove waste safely and effectively. Discuss how system components, such as pipe, drains, traps, and vents work. Explain drain and vent sizing, grade, and waste treatment. Discuss how building sewers and sewer drains connect the DWV system to the public sewer system.
7133.D2.6	Identify the major components of water distribution systems and describe their functions. Describe water sources and treatment methods and examine supply and distribution for the different types of systems installed on jobs.
7133.D2.7	Attain readiness to take the second half of NCCER Plumbing Level I certification exams.
Domain	***Career Navigation***
7133.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7133.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7133.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7133.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7133.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7133.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7133.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7133.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7133.D5.1	Demonstrate computer literacy skills and basic computer functions.
7133.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7133.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.

7133.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Plumbing and Pipefitting Fundamentals		
Career Cluster	Construction	
Program of Study	Plumbing and Pipefitting	
NLPS Sequence	B	
Course Code	7129	
Course Description	*Plumbing and Pipefitting Fundamentals will build on the knowledge and skills developed in the principles course. Students will gain a better understanding of a variety of plumbing materials and fittings. As well as focus on common plumbing installations including piping, drains, fixtures and valves.*	
Prerequisite(s)/ Corequisite(s)	Principles of Plumbing and Pipefitting	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Technology Education	
REPA/REPA 3	● CTE: Trade & Industrial Building Trades 5-12 ● CTE: Trade & Industrial: Plumbing & Pipefitting 5-12 ● Technology Education 5-12 ● Workplace Specialist: Construction Trades 9-12 ● Workplace Specialist: Plumbing & Pipefitting 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		

VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	NCCER Plumbing Level 1

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	
7129.D1.1	Discuss sizing, labeling, and applications of copper pipe and fittings and review the types of valves that can be used on copper pipe systems. Explain proper methods for cutting, joining, and installing copper pipe. Examine insulation, pressure testing, seismic codes, and handling and storage requirements.
7129.D1.2	Examine hub-and-spigot and no-hub cast-iron pipe and fittings and their applications in DWV systems. Discuss material properties, storage and handling requirements, and fittings and valves. Demonstrate joining methods, installation, and testing.
7129.D1.3	Discuss threading, labeling, and sizing of steel pipe and compare the differences between domestic and imported pipe. Demonstrate the proper techniques for measuring, cutting, threading, joining, and hanging steel pipe. Examine corrugated stainless-steel tubing.
7129.D1.4	Discuss the proper applications of code-approved fixtures in plumbing installations. Examine the different types of fixtures and the materials used in them. Investigate storage, handling, and code requirements.
7129.D1.5	Describe how DWV systems remove waste safely and effectively. Discuss how system components, such as pipe, drains, traps, and vents work. Explain drain and vent sizing, grade, and waste treatment. Discuss how building sewers and sewer drains connect the DWV system to the public sewer system.
7129.D1.6	Identify the major components of water distribution systems and describe their functions. Describe water sources and treatment methods and examine supply and distribution for the different types of systems installed on jobs.
7129.D1.7	Attain readiness to take the second half of NCCER Plumbing Level I certification exams.

Advanced Plumbing and Pipefitting	
Career Cluster	Construction
Program of Study	Plumbing and Pipefitting
NLPS Sequence	C

Course Code	7120	
Course Description	*Advanced Plumbing and Pipefitting prepares students for more advanced installations including structural penetrations, insulations, and water heaters. Additionally, students will gain a better understanding of basic electricity and fuel systems that are required for these advanced installations.*	
Prerequisite(s)/ Corequisite(s)	Principles of Plumbing and Pipefitting; Plumbing and Pipefitting Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12 ● Industrial Arts 7-12, K-12	
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12	
Rules 2002	● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Technology Education	
REPA/REPA 3	● CTE: Trade & Industrial Building Trades 5-12 ● CTE: Trade & Industrial: Plumbing & Pipefitting 5-12 ● Technology Education 5-12 ● Workplace Specialist: Construction Trades 9-12 ● Workplace Specialist: Plumbing & Pipefitting 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted	NCCER Plumbing Level 2	

Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Plumbing Math Two***
7120.D1.1	Produce a square corner using the 3-4-5 ratio
7120.D1.2	Determine the run, travel, and rise of an offset.
Domain	***Reading Commercial Drawings***
7120.D2.1	Interpret information from given site plans.
7120.D2.2	Verify the information on commercial drawings.
7120.D2.3	Lay out plumbing systems and fixture rough-ins.
7120.D2.4	Complete a material takeoff for drainage, waste, and vent (DWV) and water supply systems from information shown on drawings.
Domain	***Structural Penetrations, Insulation, and Fire-Stopping***
7120.D3.1	Cut, bore, and sleeve structural members using the appropriate tools.
7120.D3.2	Identify insulating materials and their properties.
7120.D3.3	Identify and install common types of firestopping materials and assemblies.
Domain	***Installing and Testing DWV Piping***
7120.D4.1	Develop a material takeoff from a given set of plans.
7120.D4.2	Correctly set up levels.
7120.D4.3	Identify the building sewer and building drain location.
7120.D4.4	Determine the location of fixtures and the route of the aboveground plumbing, using plans and fixture rough-in sheets.
7120.D4.5	Locate fixture rough ins using submittals.
7120.D4.6	Test the underground and aboveground DWV systems.
Domain	***Installing Roof, Floor, and Area Drains***
7120.D5.1	Set an elevation using a builder's or laser level.
7120.D5.2	Install floor drains, area drains, and floor sinks.
7120.D5.3	Install primary and secondary roof drains.
7120.D5.4	Install waterproof membranes and flashing for a shower pan.
7120.D5.5	Install a trap primer.
Domain	***Installing and Testing Water Supply Piping***
7120.D6.1	Evaluate the domestic water distribution system using plans and fixture rough-in sheets.
7120.D6.2	Install water service and a water distribution system.
7120.D6.3	Test a water supply system.
Domain	***Types of Valves***
7120.D7.1	Identify the basic types of valves.
7120.D7.2	Select a valve for a specific application.
7120.D7.3	Install and service various types of valves.
Domain	***Installing Fixtures and Valves***
7120.D8.1	Identify the pre-installation techniques to follow when installing fixtures and valves.

7120.D8.2	Install fixtures and valves at rough-in.
7120.D8.3	Install fixtures and valves at trim-out.
7120.D8.4	Identify connection procedures for various appliances.
Domain	***Installing Water Heaters***
7120.D9.1	Identify the basic operation and components of various water heaters.
7120.D9.2	Identify the safety hazards associated with water heaters.
7120.D9.3	Install water heaters.
Domain	***Basic Electricity***
7120.D10.1	Identify the safety precautions that must be followed when working on electrical equipment.
7120.D10.2	Identify how voltage, current, resistance, and power are related.
7120.D10.3	Identify the purpose and operation of the various electrical components used in plumbing equipment.
Domain	***Fuel Gas and Fuel Oil Systems***
7120.D11.1	Identify the safety precautions and potential hazards associated with fuel systems
7120.D11.2	Identify the major components of fuel systems:
7120.D11.3	Apply local codes to various fuel gas systems.

Plumbing and Pipefitting Capstone		
Career Cluster	Construction	
Program of Study	Plumbing and Pipefitting	
NLPS Sequence	D	
Course Code	7264	
Course Description	*The Plumbing and Pipefitting Capstone course competencies will be developed on an as needed basis beginning with the 2023-24 school year. The goal for this course will be to enable a student to earn at least level 3 certification or to complete one full years worth of an apprenticeship.*	
Prerequisite(s)/ Corequisite(s)	Principles of Construction Trades; Plumbing and Pipefitting Fundamentals; Advanced Plumbing and Pipefitting	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Standard Trade & Industrial: Building Trades K-12	

	● Industrial Arts 7-12, K-12
Rules 46-47	● Standard Trade & Industrial: Building Trades 9-12 ● Occupational Specialist I, II or III: Building Trades 9-12 ● Industrial Technology K-12 ● Industrial Education K-12
Rules 2002	● CTE: Trade & Industrial: Building Trades Technology ● Workplace Specialist: Building Trades Technology ● Technology Education
REPA/REPA 3	● CTE: Trade & Industrial Building Trades 5-12 ● CTE: Trade & Industrial: Plumbing & Pipefitting 5-12 ● Technology Education 5-12 ● Workplace Specialist: Construction Trades 9-12 ● Workplace Specialist: Plumbing & Pipefitting 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	NCCER Plumbing Level 3
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Applied Math***
7264.D1.1	Identify the weights and measures used in the English and metric systems.
7264.D1.2	Describe how to measure area and volume.
7264.D1.3	Describe the practical applications of area and volume in plumbing.
7264.D1.4	Explain the concepts of temperature and pressure and how they apply to plumbing installations.
7264.D1.5	Explain the functions and applications of six simple machines: inclined plane, lever, pulley, wedge, screw, and wheel and axle.
Domain	***Sizing and Protecting the Water Supply System***
7264.D2.1	Determine the factors that affect the sizing of water supply systems.
7264.D2.2	Size a given water supply system for different acceptable flow rates and calculate pressure drops in a given water system.

7264.D2.3	Describe the six basic backflow-prevention devices and the hazards they are designed to prevent.
Domain	***Potable Water Supply Treatment***
7264.D3.1	Identify the methods for disinfecting the water supply and determine the sources of contamination they address.
7264.D3.2	Identify the methods for filtering and softening the water supply and determine the sources of contamination they address.
7264.D3.3	Determine how to troubleshoot water supply problems caused by contamination.
Domain	***Types of Venting***
7264.D4.1	Describe the principles and components of vent systems and their code requirements.
7264.D4.2	Describe the different types of vent systems that plumbers install.
Domain	***Sizing DWV and Storm Systems***
7264.D5.1	Describe how to size drain, waste, and vent systems.
7264.D5.2	Describe how to size storm drainage systems.
Domain	***Sewage Pumps and Sump Pumps***
7264.D6.1	Describe the components of sewage and stormwater removal systems and explain how to size and install them.
7264.D6.2	Explain how to troubleshoot and repair sewage and stormwater removal systems.
Domain	***Corrosive-Resistant Waste Piping***
7264.D7.1	Identify corrosive wastes and handle them safely
7264.D7.2	Explain how to join and install different types of corrosive-resistant waste piping.
Domain	***Compressed Air***
7264.D8.1	Explain the types, functions, and capacities of different compressed-air systems.
7264.D8.2	Identify the different methods of conditioning compressed air.
7264.D8.3	Identify the safety issues related to compressed-air systems.
7264.D8.4	Explain the safety issues related to installing, repairing, and servicing compressed-air systems.
7264.D8.5	Explain how to install a basic compressed-air system.
Domain	***Service Plumbing***
7264.D9.1	Recognize and observe standards of safety and etiquette when making service calls to residential and commercial facilities.
7264.D9.2	Explain how to troubleshoot and repair problems with water supply systems.
7264.D9.3	Explain how to troubleshoot and repair problems with fixtures and appliances.
7264.D9.4	Explain how to troubleshoot and repair problems with DWV systems.

CTE Foundation Courses

Computing Foundations for a Digital Age	
Career Cluster	CTE Foundational Courses
Program of Study	
NLPS Sequence	
Course Code	4565
Course Description	*Computers and the internet have revolutionized the way we access and disseminate information. As technology continues to change at an ever-increasing pace, the need for students to gain a foundational understanding of computer science is clear. Computing Foundations for a Digital Age is designed to introduce students to five major topics within computer science including computing systems, networks and the internet, data and analysis, algorithms and planning, and impacts of computing. The course introduces foundational computing concepts while exploring current events and building critical thinking, collaboration, problem solving, and other important skills that are invaluable for life in a global and technologically advancing society. .*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester, 1 credit maximum
Counts Toward	Computer science requirement persuant to Indiana Code IC 20-32-4-18.
Dual Credit Status	
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma 7279
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Any 5-12 secondary educator with a valid Indiana licensure (i.e., instructional, administrator, counselor) and computer science/information technology (IT)/business professional development, training, or work experience ● Adjunct teacher holding a locally-issued adjunct teacher permit for teaching at the secondary level with work experience or training in computer science/information technology (IT)/business
Rules 46-47	● Any 5-12 secondary educator with a valid Indiana licensure (i.e., instructional, administrator, counselor) and computer science/information technology (IT)/business professional development, training, or work experience ● Adjunct teacher holding a locally-issued adjunct teacher permit for teaching at the secondary level with work experience or training in computer science/information technology (IT)/business
Rules 2002	● Any 5-12 secondary educator with a valid Indiana licensure (i.e., instructional, administrator, counselor) and computer science/information technology (IT)/business

	professional development, training, or work experience ● Adjunct teacher holding a locally-issued adjunct teacher permit for teaching at the secondary level with work experience or training in computer science/information technology (IT)/business
REPA/REPA 3	● Any 5-12 secondary educator with a valid Indiana licensure (i.e., instructional, administrator, counselor) and computer science/information technology (IT)/business professional development, training, or work experience ● Adjunct teacher holding a locally-issued adjunct teacher permit for teaching at the secondary level with work experience or training in computer science/information technology (IT)/business
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Algorithms & Programming***
4565.D1.1	Define algorithm and explain what algorithms are used for.
4565.D1.2	Describe the difference between traditional algorithms and artificial intelligence/machine learning (AI/ML) algorithms and, at a high level, describe how AI/ML algorithms work.
4565.D1.3	Explain why/how sequence matters in an algorithm.
4565.D1.4	Interpret and modify algorithms (e.g., to add functionality).
4565.D1.5	Compare (at a high level) the trade-offs (e.g., speed, memory) of different algorithms.
4565.D1.6	Reference documentation and other online tools to assist with programming.
4565.D1.7	Interpret the function of a segment of code and convert an algorithm to code.
4565.D1.8	Formulate algorithms using programming structures to decompose a complex problem.
4565.D1.9	Assess a program by testing to verify correct behavior.
4565.D1.10	Illustrate knowledge of good programming practice including the use of conventional standards and comments.
Domain	***Data & Analysis***
4565.D2.1	Identify and define data types (e.g., string, numeric, Boolean) and how it is created, stored, and used by computers.
4565.D2.2	Identify basic data formats (e.g., tables, schemas, JSON) and how computers represent data.

4565.D2.3	Understand the difference between data and metadata.
4565.D2.4	Describe how different types of data (e.g., audio, visual, spatial, environmental) can be collected computationally.
4565.D2.5	Transform and prepare (e.g., normalize, merge, clean) data visualizations, models, and simulations using data collected using computational tools such as surveys.
4565.D2.6	Analyze data using computational thinking principles to make inferences or predictions.
4565.D2.7	Evaluate approaches to cleaning data in a given context.
4565.D2.8	Assess whether and how a given question can be answered using computational methods and data, and what specific data is needed.
Domain	***Networks & the Internet***
4565.D3.1	Demonstrate awareness of the history of computing.
4565.D3.2	Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.
4565.D3.3	Compare various security measures, considering tradeoffs between the usability and security of a computing system.
4565.D3.4	Explain tradeoffs when selecting and implementing cybersecurity recommendations.
4565.D3.5	Discuss the ethical and appropriate use of computer devices and examine device usability through several lenses including accessibility, ergonomics, and learnability.
4565.D3.6	Examine the impact of the Internet on society.
Domain	***Computing Systems and Security***
4565.D4.1	Examine the dynamic between privacy and security.
4565.D4.2	Identify various types of hardware (including components) and software (including operating systems) and explore the security practices, functionality, cost, accessibility, and aesthetics of a variety of hardware and software
4565.D4.3	Explain what networks (including the Internet) are and explore the fundamental principles and components of computer networking.
4565.D4.4	Explain how an operating system, other software, and hardware work together.
4565.D4.5	Describe why cybersecurity is important and evaluate the social and emotional implications of privacy in the context of safety, law, and ethics.
4565.D4.6	Optimize operating systems and other software settings to achieve goals.
4565.D4.7	Use documentation and other resources to guide tasks such as installation and troubleshooting.
Domain	***Impacts of Computing***
4565.D5.1	Explain the privacy concerns related to the collection and generation of data through implicit and explicit processes.
4565.D5.2	Discuss the laws surrounding intellectual property.
4565.D5.3	Examine tradeoffs in computing technologies through current events related to broad ideas including privacy, communication, and automation (i.e., driverless cars can increase convenience and reduce accidents, but they are susceptible to hacking. The emerging industry will reduce the number of taxi and ride-share drivers but will create software engineering and cybersecurity jobs).
4565.D5.4	Examine how emerging technologies are impacting a variety of practices (e.g., use of facial recognition in policing, AI-generated news products).
4565.D5.5	Evaluate the use of emerging technologies (e.g., generative AI) for accuracy and to meet specific needs.

Personal Financial Responsibility (Applied Personal Financial Responsibility)	
Career Cluster	CTE Foundational Courses
Program of Study	
NLPS Sequence	
Course Code	4540
Course Description	*Personal Financial Responsibility addresses the identification and management of personal financial resources to meet the financial needs and wants of individuals and families, considering a broad range of economic, social, cultural, technological, environmental, and maintenance factors. This course helps students build skills in financial responsibility and decision making; analyze personal standards, needs, wants, and goals, identify sources of income, savings, and investing; understand banking, budgeting, record-keeping and manage risk, insurance and credit card debt. A project based approach and applications through authentic settings such as work based observations and service learning experiences are appropriate. Direct, concrete applications of mathematics proficiencies in projects are encouraged.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 credit per semester, 1 credit maximum
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas
Dual Credit Status	
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● 5-12 licensed teacher, counselor, or administrator with financial, math, or business professional development, training, or work experience
Rules 46-47	● 5-12 licensed teacher, counselor, or administrator with financial, math, or business professional development, training, or work experience
Rules 2002	● 5-12 licensed teacher, counselor, or administrator with financial, math, or business professional development, training, or work experience
REPA/REPA 3	● 5-12 licensed teacher, counselor, or administrator with financial, math, or business professional development, training, or work experience
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	

Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Financial Responsibility and Decision Making***
4540.D1.1	Students demonstrate management of individual and family finances by applying reliable information and systematic decision making
4540.D1.2	Demonstrate taking responsibility for personal financial decisions a. Explain how individuals demonstrate responsibility for financial well-being over a lifetime. b. Analyze ways financial responsibility is different for individuals with and without dependents.
4540.D1.3	Analyze financial information from a variety of reliable and questionable sources a. Analyze financial information for objectivity, accuracy, relevancy to given needs, and currency b. Investigate current types of consumer fraud, including online scam
4540.D1.4	Utilize consumer protection laws and resources a. Describe services of Indiana's consumer protection agency and its benefits to consumers b. Analyze consumer protection laws for the issues they address and the safeguards they provide c. Demonstrate steps for resolving a consumer complaint
4540.D1.5	Make financial decisions by systematically considering alternatives and consequences a. Set measurable short-term, medium-term, and long-term financial goals b. Evaluate the results of financial decisions c. Apply systematic decision making to long-term goals
4540.D1.6	Demonstrate communication strategies for discussing financial issues a. Compare and contrast the benefits of sharing financial goals and personal finance information with a potential partner before forming a partnership b. Describe essential elements of a contract between individuals and between individuals and businesses
4540.D1.7	Demonstrate strategies to control personal information a. Describe the actions a victim of identity theft can take to restore personal security
Domain	***Relating Income and Careers***
4540.D2.1	Students analyze how education, income, career and life choices relate to achieving financial goals
4540.D2.2	Describe how personal factors, career choices, and economic conditions affect income a. Analyze ways economic, social, cultural, educational, and political conditions can affect income and career potential b. Analyze the financial risks and benefits of entrepreneurship as a career choice

4540.D2.3	Identify sources of personal income a. Compare and contrast wage, gift, rent, interest, dividend, capital gain, tip, commission, and business profit as sources of personal income b. Analyze the advantages and disadvantages of participation in government assistance programs
4540.D2.4	Explain how taxes and employee benefits relate to disposable income a. Analyze typical employee benefits and explain why they are a form of compensation b. Describe benefits of employer sponsored savings plans and other personal options for shifting current income to the future
Domain	***Planning and Managing Money***
4540.D3.1	Students manage money effectively by developing financial goals and budgets
4540.D3.2	Develop a personal financial plan to demonstrate the ability to use money management skills and strategies a. Create a basic budget with categories for income, taxes, planned savings, and fixed and variable expenses b. Analyze and adjust budget categories to manage spending and achieve financial goals c. Develop a personal financial plan that shows allocation of income, spending, saving, investing and sharing/giving over a year-long time span d. Analyze a plan to secure funding for a financial goal (such as college, major consumer purchases, etc.)
4540.D3.3	Develop a system for keeping and using financial records a. Utilize a system to record income and spending for categories such as purchases, services, and taxes b. Demonstrate recordkeeping that utilizes digital financial management systems
4540.D3.4	Analyze services of financial institutions a. Evaluate different payment methods, including cash, checks, stored-value cards, debit cards, credit cards, and electronic or online payment systems b. Demonstrate skill in basic financial tasks (such as bill payments, check writing, reconciling checking and debit account statements, and monitoring printed and online account statements for accuracy) c. Investigate and demonstrate ability to apply for financial assistance (such as FAFSA, 21st Century Scholars, scholarships, grants, and aid from colleges and universities) for post-secondary education
4540.D3.5	Apply consumer skills to purchase decisions a. Evaluate impact of external factors (such as marketing, advertising and the economy) on spending decisions b. Justify consumer buying decisions by evaluating external factors c. Evaluate opportunity costs (such as owning versus renting a house, purchasing or leasing an auto) d. Recognize potential threats (such as identity fraud, scams, theft, phishing, spam, unethical internet practices) to sound financial decisions
4540.D3.6	Connect the role of charitable giving, volunteer service, and philanthropy to community development and quality of life a. Demonstrate budgeting financial and other resources to make contributions to a charitable

	organization
4540.D3.7	Examine the purpose and value of estate planning a. Contrast wills, "living wills," trusts and other ways estates can be transferred b. Evaluate estate planning tools (such as pensions, retirements, social security, trusts, and annuities)
Domain	***Managing Credit and Debt***
4540.D4.1	Students manage credit and debt to remain both creditworthy and financially secure
4540.D4.2	Analyze the costs and benefits of using various types of credit such as student loans, home and automotive loans, and credit cards a. Evaluate the cost of borrowing a set amount of money using various types of credit b. Explain how grace periods, methods of calculating interest, and fees affect borrowing costs c. Apply systematic decision making to identify the most cost-effective option for making a purchase
4540.D4.3	Analyze factors that influence establishing and maintaining a good credit rating a. Analyze the effect of positive and negative credit report s on credit worthiness b. Illustrate steps to overcome a negative credit report and improve a personal financial future
4540.D4.4	Analyze methods and benefits of avoiding or correcting credit and debt problems a. Evaluate the effect of living beyond one's financial resources b. Analyze actions that a consumer can take to reduce or better manage excessive debt
4540.D4.5	Analyze major consumer credit laws and the changing nature of these laws. a. Analyze online and printed resources for up-to-date information about consumer credit rights b. Describe debtors' and creditors' rights related to debt that is not paid
Domain	***Risk Management and Investment***
4540.D5.1	Students analyze the features of insurance, its role in balancing risk and benefit in financial planning
4540.D5.2	Examine various types of financial risk and risk management strategies a. Describe ways people can manage risk through avoidance, reduction, retention, assumption, and transfer of risk
4540.D5.3	Examine the purposes, types, and costs associated with insurance a. Analyze the types and amounts of coverage, and features needed, for various stages of life for health, property, life, disability, and liability insurance b. Analyze factors that can reduce or increase the amount and type of insurance coverage needed. c. Analyze factors that affect cost of insurance for various types of insurance
Domain	***Saving and Investing***
4540.D6.1	Students analyze saving and investing to build long-term financial security and wealth
4540.D6.2	Evaluate how saving contributes to financial wellbeing a. Analyze effect of saving strategies, including "pay yourself first," payroll deduction, automatic savings options, and reflective spending practices on financial well-being b. Compare the interest generated by simple and compound interest at various rates
4540.D6.3	Apply strategies for creating wealth and building assets

	a. Compare various investing strategies for their potential to build wealth b. Analyze investment possibilities utilizing the principles of time value of money and opportunity costs c. Calculate the end value of lump sum and periodic investments
4540.D6.4	Compare saving and investment alternatives a. Analyze the characteristics (such as earnings, risks, liquidity) and benefits of various saving and investment options in the current economy b. Analyze investment alternatives utilizing principles of inflation and other economic factors
4540.D6.5	Describe how to buy and sell investments a. Compare advantages and disadvantages of buying and selling investments through various channels, including financial advisors, investment clubs, and online brokers b. Compare the investment objectives and historical rates of return of various Investment options
4540.D6.6	Analyze factors that affect the rate of return on investments a. Analyze the rate of return on investments using time value of money and economic conditions as factors b. Calculate the amount of taxes on investments and income tax-free earnings
4540.D6.7	Analyze how agencies that regulate financial markets protect investors a. Explain how federal, and state financial regulatory agencies decrease savings and investing risks b. Identify additional services and benefits of the Indiana Securities Division and other federal and state regulators

Adult Roles and Responsibilities (Applied Adult Roles and Responsibilities)	
Career Cluster	CTE Foundational Courses
Program of Study	
NLPS Sequence	
Course Code	5330
Course Description	*Adult Roles and Responsibilities is recommended for all students as life foundations and academic enrichment, and as a career sequence course for students with interest in family and community services, personal and family finance, and similar areas. This course builds knowledge, skills, attitudes, and behaviors that students will need as they complete high school and prepare to take the next steps toward adulthood in today's society. The course includes the study of interpersonal standards, lifespan roles and responsibilities, individual and family resource management, and financial responsibility and resources. A project-based approach that utilizes higher order thinking, communication, leadership, management processes, and fundamentals to college and career success is recommended in order to integrate these topics into the study of adult roles and responsibilities. Direct, concrete mathematics and language arts proficiencies will be applied. Service learning and other authentic applications are strongly recommended. This course provides the foundation for continuing and postsecondary education in all career areas related to individual and family*

	life.
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, 1 credit per semester, 1 credit maximum
Counts Toward	Qualifies as one of the FACS courses a student can take to waive the Health & Wellness graduation requirement, in place of either Human Development and Wellness or Interpersonal Relationships. To qualify for the Health and Wellness waiver, a student must take three approved courses. For more information, see 511 IAC 6-7.1-4(c)(6).
Dual Credit Status	
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Any Home Economics K12 ● Any Vocational License
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Any Vocational or Occupational license
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Any CTE License
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Any CTE license
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	**Personal, Academic, and Career Success**
5330.D1.1	Students integrate processes of thinking, communication, leadership, and management in

	order to apply knowledge and skills for adult roles and responsibilities
5330.D1.2	Demonstrate components of critical thinking, creative thinking, and reasoning
5330.D1.3	Evaluate effective communication processes in school, family, career, and community settings
5330.D1.4	Demonstrate leadership that encourages participation and respect for the ideas, perspectives, and contributions of group members
5330.D1.5	Apply management, decision-making, and problem-solving processes to accomplish tasks and fulfill responsibilities
5330.D1.6	Examine the interrelationships among thinking, communication, leadership, and management processes to address family, community, and workplace issues
5330.D1.7	Demonstrate fundamentals to career success (e.g. strong work ethic, time- management, positive attitude, adaptability/flexibility, stress resilience, accountability, self-discipline, resourcefulness, cooperation, self-assessment)
Domain	**Interpersonal Standards**
5330.D2.1	Analyze personal standards, needs, aptitudes, and goals and their impact on family, career, and community interactions
5330.D2.2	Examine effects of self-esteem and self-image on family relationships, community service, success in the workplace, and personal fulfillment
5330.D2.3	Determine personal standards and their effects on life choices
5330.D2.4	Examine impacts of needs and aptitudes on family and community interactions, choices, and personal fulfillment
5330.D2.5	Demonstrate strategies for goal setting and goal achievement
Domain	**Lifespan Roles and Responsibilities**
5330.D3.1	Integrate multiple lifespan roles and responsibilities in family, career, and community settings
5330.D3.2	Analyze interrelationships and determine strategies for managing multiple roles and responsibilities in family, career, and community
5330.D3.3	Evaluate positive and productive ways of behaving and relating to others in family, career, and community settings
5330.D3.4	Analyze and promote parenting roles, responsibilities, and practices that maximize human growth and development
5330.D3.5	Develop a life plan, including means for acquiring the knowledge and skills needed to achieve individual, family, and career goals
Domain	**Individual and Family Resource Management**
5330.D4.1	Demonstrate management of individual and family resources, including food, clothing, shelter, and transportation
5330.D4.2	Demonstrate processes used to set standards, make choices, and satisfy needs and wants in areas such as nutrition, wellness, clothing, housing, and transportation
5330.D4.3	Demonstrate skills in seeking consumer information, taking consumer responsibility, and exercising consumer rights
5330.D4.4	Determine individual and family responsibilities in conserving, reusing, and recycling resources to maintain the environment

5330.D4.5	Apply technology and examine its impact on quality of life and family resources
Domain	**Financial Responsibility and Decision Making**
5330.D5.1	Demonstrate management of individual and family finances by applying reliable information and systematic decision making
5330.D5.2	Demonstrate taking responsibility for personal financial decisions
5330.D5.3	Analyze financial information from a variety of reliable and questionable sources
5330.D5.4	Utilize consumer protection laws and resources
5330.D5.5	Manage credit and debt to remain both creditworthy and financially secure
5330.D5.6	Analyze the features of insurance, its role in balancing risk and benefits in financial planning
5330.D5.7	Analyze saving and investing to build long-term financial security and wealth
Domain	**Relating Income and Careers**
5330.D6.1	Analyze how education, income, career, and life choices relate to achieving financial goals
5330.D6.2	Describe how personal factors, career choices, and economic conditions affect income
5330.D6.3	Identify sources of personal income
5330.D6.4	Explain how taxes and employee benefits relate to disposable income
Domain	**Planning and Managing Money**
5330.D7.1	Manage money effectively by developing financial goals and budgets
5330.D7.2	Develop a personal financial plan to demonstrate the ability to use money management skills and strategies
5330.D7.3	Develop a system for keeping and using financial records
5330.D7.4	Analyze services of financial institutions
5330.D7.5	Apply consumer skills to purchase decisions
5330.D7.6	Connect the role of charitable giving, volunteer service, and philanthropy to community development and quality of life
5330.D7.7	Examine the purpose and value of estate planning
Domain	**Managing Credit and Debt**
5330.D8.1	Manage credit and debt to remain both creditworthy and financially secure
5330.D8.2	Analyze the costs and benefits of using various types of credit such as student loans, home and automotive loans, and credit cards
5330.D8.3	Analyze factors that influence establishing and maintaining a good credit rating
5330.D8.4	Analyze methods and benefits of avoiding or correcting credit and debt problems
5330.D8.5	Analyze major consumer credit laws and the changing nature of these laws
Domain	**Risk Management and Insurance**
5330.D9.1	Analyze the features of insurance, its role in balancing risk and benefits in financial planning
5330.D9.2	Examine various types of financial risk and risk management strategies
5330.D9.3	Examine the purposes, types, and costs associated with insurance
Domain	**Saving and Investing**

5330.D10.1	Analyze saving and investing to build long-term financial security and wealth
5330.D10.2	Evaluate how saving contributes to financial wellbeing
5330.D10.3	Apply strategies for creating wealth and building assets
5330.D10.4	Compare saving and investment alternatives
5330.D10.5	Describe how to buy and sell investments
5330.D10.6	Analyze factors that affect the rate of return on investments
5330.D10.7	Analyze how agencies that regulate financial markets protect investors

Consumer Economics (Applied Consumer Economics)	
Career Cluster	CTE Foundational Courses
Program of Study	
NLPS Sequence	
Course Code	5334
Course Description	*Consumer Economics enables students to achieve high standards and competencies in economic principles in contexts of high relevancy and applicability to their individual, family, workplace, and community lives. A project-based approach that utilizes higher order thinking, communication, leadership, and management processes is recommended in order to integrate suggested topics into the study of consumer economics issues. The course focuses on interrelationships among economic principles and individual and family roles of exchanger, consumer, producer, saver, investor, and citizen. Economic principles to be studied include scarcity, supply and demand, market structure, the role of government, money and the role of financial institutions, labor productivity, economic stabilization, and trade. Depending on needs and resources, this course may be taught in a local program. In schools where it is taught, it is recommended for all students regardless of their career pathway, in order to build basic economics proficiencies.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 credit per semester, 1 credit maximum
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas
Dual Credit Status	
Additional Notes	When offered as applied: 1 unit maximum; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Any Home Economics K-12 ● Economics 7-12 ● Business 7-12

	● Vocational Business 7- 12
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Economics 7-12 ● Business 7-12 ● Business Education with vocational education 7-12
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Economics with high school setting ● Workplace Specialist: Business Management & Finance with high school setting ● Business with high school setting ● CTE: Business Services & Technology with high school setting
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Economics 5-12 ● Workplace Specialist: Business Law 9-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Processes***
5334.D1.1	Explain, demonstrate, and integrate processes of thinking, communication, leadership, and management in order to apply family and consumer sciences knowledge and skills.
5334.D1.2	Demonstrate components of critical thinking, creative thinking, and reasoning.
5334.D1.3	Evaluate effective communication processes in school, family, career, and community settings.
5334.D1.4	Demonstrate leadership that encourages participation and respect for the ideas, perspectives, and contributions of group members.
5334.D1.5	Apply management, decision-making, and problem-solving processes to accomplish tasks and

	fulfill responsibilities.
5334.D1.6	Examine the interrelationships among thinking, communication, leadership, and management processes to address family, community, and workplace issues.
Domain	***Individual and Family Economic Roles***
5334.D2.1	Analyze economic actions and responsibilities of individuals and families in their roles as exchanger, consumer, investor, saver, producer, and citizen.
5334.D2.2	Examine interrelationships among standards, needs, wants, and goals of individuals and families and their economic roles as exchanger, consumer, investor, saver, producer, and citizen.
5334.D2.3	Assess and gain control of economic roles considering personal standards, wants, needs, and goals.
5334.D2.4	Assess the power of individuals and families to proactively choose how, when and in what ways they develop and exchange their human resources for money, goods, and services.
5334.D2.5	Examine interrelationships of standards, wants, needs, goals, and consumer satisfaction.
5334.D2.6	Analyze activities and institutions used to satisfy the consumer needs and wants of individuals and families.
5334.D2.7	Determine advantages and disadvantages of investing and saving for individuals, families, and society.
5334.D2.8	Examine investment and saving activities, institutions, and alternatives.
5334.D2.9	Investigate resources and activities used by families and individuals as producers to transform human and nonhuman resources into goods and services.
5334.D2.10	Demonstrate responsible citizenship and leadership in allocating individual, family, and community resources.
Domain	***Scarcity***
5334.D3.1	Explain that because of scarcity (unlimited wants and limited resources), economics systems must be developed by individuals, families, communities, and societies in order to determine how goods and services will be produced and distributed.
5334.D3.2	Appraise how consumers and producers confront the concepts of scarcity, choice, and opportunity cost.
5334.D3.3	Define each of the productive resources (natural, human, capital) and identify the returns on each for individuals, families, and communities.
5334.D3.4	Identify the characteristics of traditional, market, command, and mixed economies in families, communities, and societies.
5334.D3.5	Compare, contrast, and examine impacts on individuals, families, and communities as to how the traditional, market, command, and mixed economic systems answer the questions: What to produce? How to produce it? For whom to produce it?
5334.D3.6	Use a production possibilities curve to explain the concepts of choice, scarcity, opportunity cost, tradeoffs, unemployment, productivity, and growth, as applied to individual, family, and community economic roles.
5334.D3.7	Identify and explain how individuals and families practice and are affected by the basic economic goals of freedom, efficiency, equity, security, and growth.

5334.D3.8	Develop and apply a decision-making model to solve economic problems in individual, family, and community settings.
Domain	***Supply and Demand***
5334.D4.1	Analyze the role that supply, demand, prices, and profits play in determining what individuals, families, businesses, communities, and societies produce and distribute in a market economy.
5334.D4.2	Demonstrate how supply and demand determine equilibrium price and quantity in the product, resource, and financial markets.
5334.D4.3	Predict factors that would cause changes in market supply and demand and their impacts on individuals, families, businesses, and communities.
5334.D4.4	Apply the laws of supply and demand in individual, family, and community situations.
5334.D4.5	Demonstrate how government wage and price controls create shortages and surpluses for individuals, families, communities, and society.
5334.D4.6	Explain the functions of profit in a market economy.
5334.D4.7	Use the concepts of price elasticity of demand and supply to explain and predict changes in quantity as price changes.
5334.D4.8	Explain how consumers ultimately determine what is produced in a market economy (consumer sovereignty).
Domain	***Market Structure***
5334.D5.1	Describe the organization and role of the firm, analyze the various types of market structures in the United States economy, and assess their impacts on individuals, families, businesses, communities, and society.
5334.D5.2	Compare and contrast the following forms of business organization: sole proprietorship, partnership, and corporation.
5334.D5.3	Identify the three basic ways that firms finance operations (retained earnings, stock issues, and borrowing), and explain the advantages and disadvantages of each.
5334.D5.4	Explain ways that firms engage in price and non-price competition and how this affects individuals, families, and communities.
5334.D5.5	Identify laws and regulations adopted in the United States to promote competition among firms. Explain how the effects of these laws have sometimes reduced competition and the impacts of this on individuals, families, and communities.
5334.D5.6	Describe the benefits of natural monopolies (economies of scale) and the purposes of government regulation of these monopolies (such as utilities).
5334.D5.7	Define cartels and explain how cartel collusion affects product price and output.
Domain	***Role of Government***
5334.D6.1	Examine government roles and actions in a market economy and their effects on individuals, families, businesses, communities, and society.
5334.D6.2	List and explain the basic functions of government in a market economy.
5334.D6.3	Identify categories of goods and services provided by various levels of government and the roles of individuals, families, and communities in selecting, supporting, producing, and using these goods and services.

5334.D6.4	Explain how government responds to positive and negative externalities in the economy.
5334.D6.5	Describe major expense and income categories and their respective proportions of state and federal budgets.
5334.D6.6	Describe different types of taxes including income, sales, property, and social security, and determine whether they are progressive, proportional, or regressive.
5334.D6.7	Assess the impact of specific progressive, proportional, and regressive taxes on individuals, families, and communities with different economic characteristics.
5334.D6.8	Assess current and future impacts of recent trends in the federal budget deficit and the national debt on individuals, families, and the national economy.
5334.D6.9	Appraise recent trends in state and federal spending and taxation and analyze the cause of recent federal budget deficits.
Domain	***Money and the Role of Financial Institutions***
5334.D7.1	Examine the role of money and financial institutions in a market economy and their impacts on individuals, families, businesses, communities, and society.
5334.D7.2	Analyze and explain the basic functions of money for individuals, families, communities, and society.
5334.D7.3	Identify the composition of the money supply in the United States.
5334.D7.4	Explain the role of banks and other financial institutions in the economy of the United States and in the day-to-day activities of individuals, families, and communities.
5334.D7.5	Describe the organization, functions, and impacts of the Federal Reserve System.
5334.D7.6	Demonstrate how banks create money through the principle of fractional reserve banking, and explain the impacts of this practice on individuals, families, and communities.
5334.D7.7	Identify different causes of inflation. Determine who gains and losses by inflation using individual, family, and community examples.
5334.D7.8	Compare and contrast services available to individuals and families from financial institutions (e.g. credit, savings, and investment).
Domain	***Labor Productivity***
5334.D8.1	Explain the importance of labor productivity to individuals, families, communities, firms, and nations by explaining how labor productivity affects income, production, costs, and standard of living.
5334.D8.2	Define labor productivity; identify basic factors (technology, education and training, specialization) which affect productivity.
5334.D8.3	Explain how increases in labor productivity improve wages and standards of living for individuals, families, communities, and society.
5334.D8.4	Explain how individual and family decisions to create and purchase new capital goods or to invest in education and training involves a trade-off of fewer consumer goods or services in the present in return for higher future labor productivity.
5334.D8.5	Explain and give individual, family, community, and society examples of economies of scale.
5334.D8.6	Explain ways that employers and employees have worked together to improve business productivity.
5334.D8.7	Compare and contrast labor productivity trends in the United States and other developed

	countries.
5334.D8.8	Demonstrate how government expenditures, regulations, and tax policy can influence labor productivity.
5334.D8.9	Compare and contrast how market and nonmarket forces (such as union activity, family friendly policies) influence wage rates and labor productivity.
Domain	***Economic Stabilization***
5334.D9.1	Describe economic stabilization policies, how they impact the economy, and how they influence and are influenced by individuals, families, businesses, communities, and society.
5334.D9.2	Define/explain the following concepts and their interrelationships with the economic roles and activities of individuals, families, and communities: fiscal policy, monetary policy, aggregate supply and demand, unemployment, gross domestic product.
5334.D9.3	Explain the four phases of the business cycle: expansion, peak, contraction, and recession.
5334.D9.4	Explain how the relationship between aggregate supply and aggregate demand is an important determinant of the levels of unemployment and inflation in an economy.
5334.D9.5	Explain how the government uses taxing and spending decision (fiscal policy) to promote price stability, maximum employment, and economic growth.
5334.D9.6	Explain the limitations of using Gross Domestic Product (GDP) to measure economic welfare.
5334.D9.7	Explain how the Federal Reserve uses monetary tools to promote price stability, maximum employment, and economic growth.
5334.D9.8	Explain how monetary policy affects the level of inflation in the economy.
Domain	***Trade***
5334.D10.1	Explain why nations trade goods and services and explain the impact of trade on the economies of the nations involved.
5334.D10.2	Define/explain the following concepts, with an emphasis on individual, family, and community applications and impacts: absolute advantage, comparative advantage, quotas, tariffs, exchange rates, balance of payments, balance of trade, trade deficit.
5334.D10.3	Explain the benefits of trade among individuals, families, businesses, communities, regions, and nations.
5334.D10.4	Explain why countries sometimes erect barriers to trade.
5334.D10.5	Summarize the arguments for and against free trade.
5334.D10.6	Explain the difference between balance of trade and balance of payments.
5334.D10.7	Explain fluctuations in currency exchange rates and how these fluctuations affect trade.
5334.D10.8	Describe impacts of trade agreements such as the North Atlantic Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT) on individuals, families, communities, and countries.

Advanced Nutrition and Wellness	
Career Cluster	CTE Foundational Courses
Program of Study	
NLPS Sequence	Introductory
Course Code	5340
Course Description	*Advanced Nutrition and Wellness is a course which provides an extensive study of nutrition. This course is recommended for all students wanting to improve their nutrition and learn how nutrition affects the body across the lifespan. Advanced Nutrition and Wellness is an especially appropriate course for students interested in careers in the medical field, athletic training and dietetics. This course builds on the foundation established in Nutrition and Wellness, which is a required prerequisite. This is a project-based course utilizing higher-order thinking, communication, leadership and management processes. Topics include extensive study of major nutrients, nutritional standards across the lifespan, influences on nutrition/food choices, technological and scientific influences, and career exploration in this field. Laboratory experiences will be utilized to develop food handling and preparation skills; attention will be given to nutrition, food safety, and sanitation. This course is the second in a sequence of courses that provide a foundation for continuing and postsecondary education in all career areas related to nutrition, food, and wellness.*
Prerequisite(s)/ Corequisite(s)	None Recommended: Nutrition and Wellness
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	Introductory
Bulletin 400	● Any Home Economics K-12
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● A related Occupational Specialist with specific training/experience in nutrition and wellness
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● A related Workplace Specialist with specific training/experience in nutrition and wellness
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● A related Workplace Specialist with specific training/experience in nutrition and wellness
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course	

Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Personal, Academic, and Career Success***
5340.D1.1	Integrate processes of thinking, communication, leadership, and management in order to apply knowledge and skills for nutrition, food, and wellness.
5340.D1.2	Demonstrate components of critical thinking, creative thinking, and reasoning.
5340.D1.3	Evaluate effective communication processes in school, family, career, and community settings.
5340.D1.4	Demonstrate leadership that encourages participation and respect for the ideas, perspectives, and contributions of group members.
5340.D1.5	Apply management, decision-making, and problem-solving processes to accomplish tasks and fulfill responsibilities.
5340.D1.6	Examine the interrelationships among thinking, communication, leadership, and management processes to address family, community, and workplace issues.
5340.D1.7	Demonstrate fundamentals to career success (e.g. strong work ethic, time- management, positive attitude, adaptability/flexibility, stress resilience, accountability, self-discipline, resourcefulness, cooperation, self-assessment).
Domain	***Nutrition Principles***
5340.D2.1	Synthesize physiological functions, requirements, and food sources for each of the major nutrients (protein, carbohydrates, fats, vitamins, minerals, and water).
5340.D2.2	Research the physiological functions of the major nutrients for the body (protein, carbohydrates, fats, vitamins, minerals, and water).
5340.D2.3	Recommend food sources following dietary guidelines for each of the major nutrients.
5340.D2.4	Analyze variations in daily dietary requirements of each nutrient in order to meet nutrition needs across the life span and for special dietary needs.
5340.D2.5	Predict the physiological consequences of an excessive or an insufficient amount of each nutrient in the diet.
5340.D2.6	Develop and create meals and snacks offering a variety of foods which supply each major nutrient.
Domain	***Nutrition Applications Across the Lifespan***

5340.D3.1	Analyze different ways that nutrition affects the body across the lifespan.
5340.D3.2	Evaluate standards for maintaining healthy nutrition across the life span (e.g., Choose YourPlate.gov, dietary guidelines, portion/serving sizes, nutrition labels).
5340.D3.3	Differentiate among various nutrition guidelines for different age groups and dietary needs (e.g., children, elderly, pregnant women, athletes, diabetics; individuals who are lactose-intolerant, require a gluten free diet, and/or have food allergies).
5340.D3.4	Develop and create healthy meals and snacks address individual and family resources, activities, and preferences (e.g., time constraints, financial and equipment limitations, extent of physical activity, dietary preferences such as vegetarian).
5340.D3.5	Develop individual nutrition and physical activity goals, reevaluating those goals and modifying them across the lifespan as needed.
5340.D3.6	Predict outcomes to nutrition challenges related to eating disorders, fad diets, and other factors relating to nutrition.
Domain	***Influences on Nutrition and Wellness***
5340.D4.1	Explore ways that families, culture, communities, and governments influence nutrition and health of individuals.
5340.D4.2	Examine cultural and ethnical influences on individual food choices, dietary patterns, and practices.
5340.D4.3	Determine economic and governmental influences on food choices/availability and nutritional practices through legislation and regulations.
5340.D4.4	Discover various international cuisines and their influence on eating patterns.
5340.D4.5	Demonstrate appropriate etiquette for business and social situations.
5340.D4.6	Research government and community programs that support nutritional needs of individuals and families (e.g., Family Nutrition Program [FNP]; food co-ops; food pantries; Supplemental Nutrition and Purchasing [SNAP]; Women, Infants, and Children program [WIC]).
Domain	***Food Preparation, Safety, and Handling***
5340.D5.1	Implement principles of food acquisition, handling, and preparation.
5340.D5.2	Select, adapt, and prepare recipes to increase healthy aspects and accommodate specific dietary needs (e.g., energy needs, diabetes, lactose intolerance, celiac disease, food allergies).
5340.D5.3	Demonstrate proper food preparation skills, selection, and storage of food.
5340.D5.4	Select and apply safety and sanitation practices that promote personal safety, food safety, and prevention of food borne illnesses.
Domain	***Science and Technology in Foods and Nutrition***
5340.D6.1	Explore impacts of science and technology on nutrition and foods.
5340.D6.2	Determine impacts of technology, Internet, and social media as related to food choices, nutrient content, availability, and safety of food supply.
5340.D6.3	Apply information about current nutrition and food trends and issues, such as “farm to table,” food availability, organic food, and holistic eating practices.
5340.D6.4	Utilize available technological tools that support healthy nutrition practices (e.g., online programs and applications to calculate calories, dietary exchanges, and physical activity;

	www.ChooseMyPlate.gov; and others).
5340.D6.5	Examine and propose marketing practices that promote food production, choice/availability, and purchasing.
Domain	***Career Exploration in Nutrition, Food, and Wellness***
5340.D7.1	Investigate career pathways, education, and training in areas related to nutrition, food, and wellness.
5340.D7.2	Examine potential career paths, trends, and job market opportunities related to nutrition, food, and wellness.
5340.D7.3	Determine roles and functions; knowledge, skills, and attitudes; and rewards and demands associated with various careers and levels of employment related to nutrition, food, and wellness.
5340.D7.4	Analyze personal qualifications, interests, values, and educational preparation required for careers and employment in nutrition, food, and wellness-related industries.
5340.D7.5	Identify volunteer roles, part-time jobs, and entry-level positions that offer opportunities to explore careers related to nutrition, food, and wellness.

Nutrition and Wellness	
Career Cluster	CTE Foundational Courses
Program of Study	
NLPS Sequence	Introductory
Course Code	5342
Course Description	*Nutrition and Wellness is an introductory course valuable for all students as a life foundation and academic enrichment; it is especially relevant for students interested in careers related to nutrition, food, and wellness. This is a nutrition class that introduces students to only the basics of food preparation so they can become self-sufficient in accessing healthy and nutritious foods. Major course topics include nutrition principles and applications; influences on nutrition and wellness; food preparation, safety, and sanitation; and science, technology, and careers in nutrition and wellness. A project-based approach that utilizes higher order thinking, communication, leadership, management processes, and fundamentals to college and career success is recommended in order to integrate these topics into the study of nutrition, food, and wellness.* ***Food preparation experiences are a required component.*** *Direct, concrete mathematics and language arts proficiencies will be applied. This course is the first in a sequence of courses that provide a foundation for continuing and postsecondary education in all career areas related to nutrition, food, and wellness.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 credit per semester, 1 credit maximum
Counts Toward	• Qualifies as one of the FACS courses a student can take to waive the Health & Wellness graduation requirement. To qualify for the Health and Wellness waiver, a

	student must take three of the approved courses. For more information, see 511 IAC 6-7.1-4(c)(6). • Local programs have the option of offering a second version of the course that is focused more on the fitness aspects of wellness and nutrition. This version may be taught within the family and consumer sciences department, or it may be interdisciplinary, and team taught or co-taught with a teacher licensed in physical education. Such a course may be differentiated from the regular course offering by using subtitles in addition to Nutrition and Wellness. A student may earn credits for multiple versions of the course. No waiver is required in this instance.
Dual Credit Status	
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Any Home Economics K-12 ● Health K-12 ● Physical Education And Health 7-12
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Health 9-12 ● Occupational Specialist Health Careers 9-12 ● Health Occupations 9-12 ● A related Occupational Specialist with specific training/experience in nutrition and wellness
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Health with high school setting ● CTE: Health Occupations with high school setting ● Workplace Specialist: Anatomy & Physiology with high school setting ● Workplace Specialist: Health Science – Special Topics with high school setting ● Workplace Specialist: Nursing with high school setting ● A related Workplace Specialist with specific training/experience in nutrition and wellness
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Health 5-12 ● CTE: Health Occupations 5-12 ● Workplace Specialist: Anatomy & Physiology 9-12 ● Workplace Specialist: Health Science – Special Topics 9-12 ● Workplace Specialist: Nursing 9-12 ● A related Workplace Specialist with specific training/experience in nutrition and wellness
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	

Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Personal, Academic, and Career Success***
5342.D1.1	Integrate processes of thinking, communication, leadership, and management in order to apply knowledge and skills for nutrition, food, and wellness
5342.D1.2	Demonstrate components of critical thinking, creative thinking, and reasoning
5342.D1.3	Evaluate effective communication processes in school, family, career, and community settings
5342.D1.4	Demonstrate leadership that encourages participation and respect for the ideas, perspectives, and contributions of group members
5342.D1.5	Apply management, decision-making, and problem-solving processes to accomplish tasks and fulfill responsibilities
5342.D1.6	Examine the interrelationships among thinking, communication, leadership, and management processes to address family, community, and workplace issues
5342.D1.7	Demonstrate fundamentals to career success (e.g. strong work ethic, goal setting, time-management, positive attitude, adaptability/flexibility, stress resilience, accountability, self-discipline, resourcefulness, cooperation, self-assessment)
5342.D1.8	Demonstrate etiquette skills for business and social situations
5342.D1.9	Apply knowledge gained through research to solve problems and communicate ideas in the fields of food, fitness, nutrition, and wellness
Domain	***Nutrition Principles and Applications***
5342.D2.1	Apply nutrition principles to health and wellness choices across the life span
5342.D2.2	Analyze food and nutrition information, including USDA Dietary guidelines and MY Plate, to meet nutrition and wellness goals across the lifespan
5342.D2.3	Demonstrate proper portion sizes from each of the food groups to meet nutrition and wellness needs of individuals across the lifespan
5342.D2.4	Describe the six classes/groups of nutrients, explain their functions to meet health and nutrition requirements of individuals and families, and classify food sources
5342.D2.5	Compare food label information to make health and wellness choices
5342.D2.6	Analyze and assess wellness goals across the lifespan, particularly for teenagers (e.g., food fads and fallacies, extreme procedures for weight management, sports supplements, nutritional supplements)
Domain	***Influences on Nutrition and Wellness***

5342.D3.1	Analyze factors that influence nutrition and wellness practices
5342.D3.2	Assess physical, emotional, social, intellectual, cultural, and ethnic components of individual and family wellness
5342.D3.3	Explain how geographical location and climate location affects food selection and availability
5342.D3.4	Examine how economic factors affect food selection and availability
5342.D3.5	Identify legislation and regulations related to food, nutrition, and wellness issues
5342.D3.6	Evaluate the nutritive value and costs of snacks, fast foods, and balanced meals
Domain	***Food Preparation, Safety, and Handling***
5342.D4.1	Demonstrate abilities to prepare and serve safe, nutritious foods
5342.D4.2	Define and explain food borne illness and demonstrate how to prevent them by applying the concepts of "clean, separate, cook, and chill"
5342.D4.3	Demonstrate basic abilities to safely use and maintain equipment within a kitchen setting, including large and small appliances, small kitchen tools, measuring tools, and knives
5342.D4.4	Demonstrate abilities to prepare nutritious foods using a variety of basic methods and techniques
5342.D4.5	Apply basic principles of resource management when planning, preparing, and serving nutritious food, including food costs and availability, work plans and timetables, efficient work methods, and collaboration with others
5342.D4.6	Demonstrate abilities to increase and decrease recipe measurements based on desired yield
Domain	***Science, Technology, and Careers in Nutrition and Wellness***
5342.D5.1	Analyze impacts of science, technology, and careers on nutrition and wellness
5342.D5.2	Discuss current technology and techniques used to develop, produce, process, and store foods and their impacts on food safety, nutrition, and wellness (e.g., organic, holistic, genetics, hormones)
5342.D5.3	Explore technological tools and advancements used to track nutrition and wellness goals and progress
5342.D5.4	Examine developments and trends in food marketing, and their impacts on family and consumer choices
5342.D5.5	Discuss trends, employment opportunities, and preparation requirements for careers related to nutrition, food, and wellness

Advanced Child Development	
Career Cluster	CTE Foundational Courses
Program of Study	Introductory
NLPS Sequence	
Course Code	5360
Course Description	*Advanced Child Development is for those students interested in life foundations, academic enrichment, and/or careers related to knowledge of children, child development, and*

	nurturing of children. This course addresses issues of child development from ages four through age eight (grade three). It builds on the Child Development course, which is a prerequisite. Advanced Child Development includes the study of professional and ethical issues in child development; child growth and development; child development theories, research, and best practices; child health and wellness; teaching and guiding children; special conditions affecting children; and career exploration in child development and nurturing. A project-based approach that utilizes higher order thinking, communication, leadership, management, and fundamentals to college and career success is recommended in order to integrate these topics into the study of child development. Direct, concrete mathematics and language arts proficiencies will be applied.
Prerequisite(s)/ Corequisite(s)	None Recommend: Child Development
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	Introductory
Bulletin 400	● Any Home Economics K-12 ● A teacher with an Elementary, Kindergarten, Primary, Early Childhood or Psychology license with 5 years teaching experience
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● A teacher with an Elementary, Kindergarten-Primary, Early Childhood or Psychology license with 5 years teaching experience
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Early Childhood Education & Services with work experience as lead teacher in a preschool setting ● A teacher with an Elementary, Kindergarten-Primary, Early Childhood or Psychology license with 5 years teaching experience
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Early Childhood Education & Services with work experience as lead teacher in a preschool setting ● A teacher with an Elementary, Kindergarten-Primary, Early Childhood or Psychology license with 5 years teaching experience
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course	

Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Personal, Academic, and Career Success***
5360.D1.1	Students will integrate processes of thinking, communication, leadership, and management to apply child development knowledge and skills.
5360.D1.2	Demonstrate components of critical thinking, creative thinking, and reasoning.
5360.D1.3	Evaluate effective communication processes in school, family, career, and community setting.
5360.D1.4	Demonstrate leadership that encourages participation and respect for the ideas, perspectives, and contributions of group members.
5360.D1.5	Apply management, decision-making, and problem-solving processes to accomplish tasks and fulfill responsibilities.
5360.D1.6	Examine the interrelationships among thinking, communication, leadership, and management processes to address family, community, and workplace issues.
5360.D1.7	Demonstrate fundamentals to college and career success (e.g. strong work ethic, time-management, positive attitude, adaptability/flexibility, stress resilience, accountability, self-discipline, resourcefulness, cooperation, self-assessment).
Domain	***Professional and Ethical Issues in Child Development***
5360.D2.1	Incorporate established professional and ethical standards related to working with children and their families to promote optimum development in safe and healthy environments.
5360.D2.2	Utilize emerging technologies responsibly to enhance child-related interactions and careers.
5360.D2.3	Apply professional codes of conduct for interacting with children, their families, and co-workers (i.e., the NAEYC Code of Ethical Conduct).
5360.D2.4	Devise standards and demonstrate techniques for positive, collaborative relationships with children, their families, and co-workers.
Domain	***Child Growth and Development***
5360.D3.1	Analyze human growth and development of children ages four to eight.
5360.D3.2	Examine physical, intellectual, emotional, social, and moral s domains of human growth and development, ages four to eight.
5360.D3.3	Investigate impacts of heredity and environment on growth and development of children, ages four to eight.

5360.D3.4	Assess effects of nutrition on the growth and development of children, ages four to eight.
5360.D3.5	Examine how gender, ethnicity, and life events relate to the child's development, ages four to eight.
Domain	***Child Development Theories, Research, and Best Practices***
5360.D4.1	Choose positive approaches for creating a nurturing environment for children ages four to eight based on accepted child development theories, research, and best practices.
5360.D4.2	Examine roles and responsibilities of the family unit, caregivers, and educators for nurturing children, providing children with a stimulating environment, and transmitting societal expectations, culture, and traditions to children.
5360.D4.3	Examine policies, issues, and trends in the workplace, community, nation, and world that impact children and child nurturing practices.
5360.D4.4	Analyze impacts of social, economic, technological, and environmental forces, including media and marketing, on adult actions related to children and on child growth and development.
5360.D4.5	Examine laws and legal issues that impact children, parents, care givers, child educators, and child nurturing practices.
5360.D4.6	Determine strategies for advocating on behalf of children and families in areas such as childcare, prevention of child abuse and neglect, and parental support.
Domain	***Child Health and Wellness***
5360.D5.1	Demonstrate practices, including resource management processes, which promote the well-being and development of children ages four to eight.
5360.D5.2	Examine the use of family resources in making choices that satisfy the needs and wants of children.
5360.D5.3	Design strategies to meet nutrition requirements and provide safe and nutritious food for children.
5360.D5.4	Provide a safe and supportive environment through developmentally appropriate clothing, housing, furnishings, toys, equipment, and modes of transportation.
5360.D5.5	Examine information and analyze options for health and wellness practices to enhance long-term well-being and development of children.
5360.D5.6	Identify available community services and resources, including financial resources that contribute to the long-term well-being and development of children.
Domain	***Teaching and Guiding Children***
5360.D6.1	Evaluate and implement developmentally appropriate teaching practices and guidance to enhance children's growth and development ages four to eight.
5360.D6.2	Assess strategies that promote physical, emotional, social, intellectual, cultural, and moral development of children.
5360.D6.3	Analyze components of an integrated curriculum that incorporate a child's language, learning styles, home experiences, and cultural values.
5360.D6.4	Demonstrate respect for diversity with sensitivity to anti-bias, gender equity, age, culture, and ethnicity related to children, parenting, and child nurturing practices.
5360.D6.5	Choose positive guidance and discipline practices that promote child growth and development.

5360.D6.6	Formulate nonviolent, proactive strategies to prevent and manage conflict between children and between adults and children, including bullying.
5360.D6.7	Access, evaluate, and utilize current and emerging research related to child growth and development related to early childhood practices and procedures.
Domain	***Special Conditions Affecting Children***
5360.D7.1	Explore factors affecting children and families with a variety of special (economic, physical, emotional, intellectual, and societal) conditions and the resources available to children and families dealing with these factors.
5360.D7.2	Examine characteristics, needs, and interventions related to children with special needs, such as those who are academically gifted; have learning, emotional, and physical difficulties; and experience developmental delays
5360.D7.3	Investigate inherited and environmental conditions which adversely affect children and determine interventions to provide a safe and secure environment for children.
5360.D7.4	Determine situations that require crisis intervention and community services available to provide this intervention.
5360.D7.5	Identify support services and referral processes for children and families, including those from friends, family, community, and social agencies.
Domain	***Career Exploration in Child Development and Nurturing***
5360.D8.1	Investigate career pathways, education, and training in areas related to children, child development, and nurturing of children.
5360.D8.2	Examine potential career paths, trends, and job market opportunities in areas related to children, child development, and nurturing of children.
5360.D8.3	Determine roles and functions; knowledge, skills, and attitudes; and rewards and demands associated with various careers and levels of employment in areas related to children, child development, and nurturing of children.
5360.D8.4	Analyze personal qualifications, interests, values, and educational preparation required for careers and employment in areas related to children, child development, and nurturing of children.
5360.D8.5	Identify volunteer roles, part-time jobs, and entry-level positions that offer opportunities to explore careers related to children, child development, and nurturing of children.

Child Development	
Career Cluster	CTE Foundational Courses
Program of Study	
NLPS Sequence	Introductory
Course Code	5362
Course Description	*Child Development is an introductory course for all students as a life foundation and academic enrichment; it is especially relevant for students interested in careers that draw on knowledge of children, child development, and nurturing of children. This course addresses issues of child*

	development from conception/prenatal through age 3. It includes the study of prenatal development and birth, growth and development of children, child caregiving and nurturing, and support systems for parents and caregivers. A project-based approach that utilizes higher order thinking, communication, leadership, management processes, and fundamentals to college and career success is recommended in order to integrate these topics into the study of child development. Direct, concrete mathematics and language arts proficiencies will be applied. Authentic applications such as introductory laboratory/field experiences with young children and/or service learning that build knowledge of children, child development, and nurturing of children are strongly recommended. This course provides the foundation for continuing and postsecondary education in all career areas related to children, child development, and nurturing of children.
Prerequisite(s)/ Corequisite(s)	None
Credits	1 credit per semester, 1 credit maximum
Counts Toward	
Dual Credit Status	
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Any Home Economics K-12 ● Nursery School ● Psychology 7-12 ● A teacher with an Elementary, KindergartenPrimary, Early Childhood or Psychology license with 5 years teaching experience
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist: Child Development 9-12 ● A teacher with an Elementary, Kindergarten-Primary, Early Childhood or Psychology license with 5 years teaching experience
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Early Childhood Education ● Psychology 5-12 ● Workplace Specialist: Early Childhood Education & Services with high school setting ● Workplace Specialist: Health Sciences – Special Topics with high school setting ● A teacher with an Elementary, Kindergarten-Primary, Early Childhood or Psychology license with 5 years teaching experience
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Early Childhood Education P-3 ● Psychology 5-12 ● Workplace Specialist: Early Childhood Education & Services 9-12 ● Workplace Specialist: Health Sciences – Special Topics 9-12

	● A teacher with an Elementary, Kindergarten-Primary, Early Childhood or Psychology license with 5 years teaching experience
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Personal, Academic, and Career Success***
5362.D1.1	Integrate processes of thinking, communication, leadership, and management in order to apply child development knowledge and skills.
5362.D1.2	Demonstrate components of critical thinking, creative thinking, and reasoning.
5362.D1.3	Evaluate effective communication processes in school, family, career, and community settings
5362.D1.4	Demonstrate leadership that encourages participation and respect for the ideas, perspectives, and contributions of group members.
5362.D1.5	Apply management, decision-making, and problem-solving processes to accomplish tasks and fulfill responsibilities.
5362.D1.6	Examine the interrelationships among thinking, communication, leadership, and management processes to address family, community, and workplace issues.
5362.D1.7	Demonstrate fundamentals to college and career success (e.g. strong work ethic, time-management, positive attitude, adaptability/flexibility, stress resilience, accountability, self-discipline, resourcefulness, cooperation, self-assessment).
5362.D1.8	Apply knowledge gained through research to solve problems and communicate ideas in fields related to child development.
Domain	***Conception, Prenatal Development, and Birth***
5362.D2.1	Analyze factors related to preparing for the birth of a child.
5362.D2.2	Examine biological processes related to conception, prenatal development, birth, and health of child and mother.
5362.D2.3	Evaluate physical, emotional, and environmental factors of prenatal development and birth in relation to the health of the parents and child.
5362.D2.4	Analyze legal, moral, and ethical impacts of technology related to the birth of a child (e.g.,

	infertility issues, surrogacy, selective abortion due to health of unborn child or multiple births, stem cell usage, and others).
Domain	***Growth and Development of Children***
5362.D3.1	Analyze human growth and development from prenatal through age three.
5362.D3.2	Survey the history of child development, including prominent theorists.
5362.D3.3	Examine physical, intellectual, emotional, social, and moral domains of human growth and development of children across a range of birth through age three.
5362.D3.4	Investigate impacts and relationships of heredity and environment on prenatal and early childhood human growth and development.
5362.D3.5	Assess effects of pre-pregnancy, prenatal, and postnatal nutrition on health and wellness of mother and child.
5362.D3.6	Examine how gender, ethnicity, culture, and life events impact child development.
Domain	***Childcare Giving and Nurturing Practices***
5362.D4.1	Choose care giving practices and nurturing strategies that maximize growth and development of children.
5362.D4.2	Apply current and emerging research on human growth and development, including brain research, to assess nurturing practices.
5362.D4.3	Evaluate communication strategies that promote positive self-esteem in children.
5362.D4.4	Implement nurturing practices that support human growth and development of young children.
5362.D4.5	Analyze impacts of abuse and neglect on children and families and identify methods of prevention.
5362.D4.6	Examine nurturing practices unique to infants and young children with special needs.
Domain	***Support Systems for Parents and Caregivers***
5362.D5.1	Evaluate support systems that provide services for parents and caregivers.
5362.D5.2	Evaluate criteria for selecting and providing care and services, including preventative health care, for children.
5362.D5.3	Explain the importance of friends, family, and community relationships in supporting parents and caregivers.
5362.D5.4	Describe community resources, services, and opportunities that support parenting and nurturing.
5362.D5.5	Analyze current laws, regulations, and policies related to parenting and care giving.
5362.D5.6	Discuss careers that draw on knowledge of children, child development, and nurturing of children.

Interpersonal Relationships (Applied Interpersonal Relationships)	
Career Cluster	CTE Foundational Courses
Program of Study	
NLPS Sequence	Introductory
Course Code	5364
Course Description	*Interpersonal Relationships is an introductory course that is especially relevant for students interested in careers that involve interacting with people. It is also valuable for all students as a life foundation and academic enrichment. This course addresses knowledge and skills needed for positive and productive relationships in career, community, and family settings. Major course topics include communication skills; leadership, teamwork, and collaboration; conflict prevention, resolution, and management; building and maintaining relationships; and individual needs and characteristics and their impacts on relationships. A project-based approach that utilizes higher order thinking, communication, leadership, management processes, and fundamentals to college and career success is recommended in order to integrate these topics into the study of interpersonal relationships. Direct, concrete language arts proficiencies will be applied. Service learning and other authentic applications are strongly recommended. This course provides a foundation for continuing and postsecondary education for all career areas that involve interacting with people both inside and outside of a business/organization including team members, clients, patients, customers, and the general public.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 to 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	Qualifies as one of the FACS courses a student can take to waive the Health & Wellness graduation requirement. To qualify for the Health and Wellness waiver, a student must take three of the approved courses. For more information, see 511 IAC 6-7.1-4(c)(6).
Dual Credit Status	
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Any Home Economics K-12 ● Any Vocational License
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Any Occupational license
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Any CTE License
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12

	● Any CTE License
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Personal, Academic, and Career Success***
5364.D1.1	Integrate processes of thinking, communication, leadership, and management to apply interpersonal relationships knowledge and skills.
5364.D1.2	Evaluate effective communication processes in school, family, career, and community settings.
5364.D1.3	Demonstrate leadership that encourages participation and respect for the ideas, perspectives, and contributions of group members.
5364.D1.4	Apply management, decision-making, and problem-solving processes to accomplish tasks and fulfill responsibilities.
5364.D1.5	Examine interrelationships among thinking, communication, leadership, and management processes to address individual, family, community, and workplace issues.
5364.D1.6	Demonstrate fundamentals to college and career success (e.g. strong work ethic, time-management, positive attitude, adaptability/flexibility, stress resilience, accountability, self-discipline, resourcefulness, cooperation, self-assessment).
5364.D1.7	Apply standards of ethical behavior when making judgments or taking personal actions.
5364.D1.8	Apply knowledge gained through research to solve problems and communicate ideas in fields related to interpersonal relationships.
Domain	***Building and Maintaining Relationships***
5364.D2.1	Examine processes for building and maintaining various types of relationships in career, community, and family settings.
5364.D2.2	Analyze purposes and expectations of various types of relationships in career, community, and family settings.
5364.D2.3	Explore impacts of multiple life roles and responsibilities on relationships.
5364.D2.4	Examine and contrast characteristics and consequences of healthy and unhealthy relationships in career, community, and family settings.

5364.D2.5	Distinguish codes of conduct and their impacts on relationships in career, community, and family settings
5364.D2.6	Discuss careers that draw on knowledge and skills for interacting with people.
Domain	***Impacts of Individual Needs and Personal Characteristics***
5364.D3.1	Evaluate individual needs and personal characteristics and their impacts on interpersonal relationships.
5364.D3.2	Examine ways relationships are influenced by personal characteristics and stages of physical, intellectual, emotional, social, and moral development.
5364.D3.3	Evaluate influences of personal needs and wants and on relationships in career, community, and family settings.
5364.D3.4	Consider effects of self-esteem and self-image on relationships in career, community, and family settings.
5364.D3.5	Analyze impacts of personal standards and behaviors on relationships in career, community, and family settings.
5364.D3.6	Examine impacts of stress management on relationships in career, community, and family settings.
Domain	***Communication Skills***
5364.D4.1	Demonstrate communication skills that contribute to relationships in career, community, and family settings.
5364.D4.2	Describe basic components of the communication process (i.e., source, encoding, channel, decoding, receiver, feedback, context).
5364.D4.3	Evaluate and apply attitudes that contribute to effective communication in career, community, and family settings.
5364.D4.4	Demonstrate effective listening and feedback techniques and assess their influences on relationships in career, community, and family settings.
5364.D4.5	Analyze strategies to overcome communication barriers in career, community, and family settings.
5364.D4.6	Analyze principles of ethical communication in career, community, and family settings.
5364.D4.7	Assess impacts of selection and use of communication technologies on relationships in career, community, and family settings.
5364.D4.8	Choose appropriate communication methods and styles for business and social situations.
Domain	***Conflict Prevention, Resolution, and Management***
5364.D5.1	Evaluate effective conflict prevention, resolution, and management techniques.
5364.D5.2	Describe key components of preventing, resolving, and managing conflicts in career, community, and family settings.
5364.D5.3	Demonstrate effective responses to conflict and harassment in career, community, and family settings.
5364.D5.4	Implement strategies to increase tolerance of individual or group differences; prevent bullying, violence, and abuse; and encourage peaceful resolution of conflict in career, community, and family settings.

5364.D5.5	Assess community resources, services, and agencies that support conflict prevention, resolution, and management.
Domain	***Leadership, Teamwork, and Collaboration***
5364.D6.1	Demonstrate leadership, teamwork, and collaboration in career, community, and family settings.
5364.D6.2	Evaluate leadership styles and techniques, including democratic/collaborative and authoritarian, as used in career, community, and family settings.
5364.D6.3	Create an environment that encourages and respects the ideas, perspectives, and contributions of all group members in career, community, and family settings.
5364.D6.4	Demonstrate strategies to motivate, encourage, and build trust among group members in career, community, and family settings.
5364.D6.5	Demonstrate ways to organize and delegate responsibilities in career, community, and family settings.
5364.D6.6	Create strategies to integrate new members into the team in career, community, and family settings.
5364.D6.7	Demonstrate processes for cooperating, compromising, and collaborating in career, community, and family settings.

Human Development and Wellness	
Career Cluster	CTE Foundational Courses
Program of Study	
NLPS Sequence	
Course Code	5366
Course Description	*Human Development and Wellness is valuable for all students as a life foundation and academic enrichment. It is especially relevant for students interested in careers impacted by individuals' physical, social, emotional, and moral development and wellness across the lifespan. Major topics include principles of human development and wellness, impacts of family on human development and wellness, factors that affect human development and wellness, practices that promote human development and wellness, managing resources and services related to human development and wellness, and career exploration in human development and wellness. Life events and contemporary issues addressed in this course include (but are not limited to) change, stress, abuse, personal safety, and relationships among lifestyle choices, health and wellness conditions, and diseases. A project-based approach that utilizes higher order thinking, communication, leadership, and management processes is recommended in order to integrate the study of these topics. Authentic applications through service learning are encouraged.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum

Counts Toward	Qualifies as one of the FACS courses a student can take to waive the Health & Wellness graduation requirement. To qualify for the Health and Wellness waiver, a student must take three of the approved courses. For more information, see 511 IAC 6-7.1-4(c)(6).
Dual Credit Status	X
Additional Notes	Course may be offered as an applied course
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Any Home Economics K-12 ● Health K-12
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Health 9-12
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Health with high school setting
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Health 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Personal, Academic, and Career Success***
5366.D1.1	Integrate processes of thinking, communication, leadership, and management in order to apply human development and wellness knowledge and skills.
5366.D1.2	Demonstrate components of critical thinking, creative thinking, and reasoning
5366.D1.3	Evaluate effective communication processes in school, family, career, and community settings
5366.D1.4	Demonstrate leadership that encourages participation and respect for the ideas, perspectives, and contributions of group members
5366.D1.5	Apply management, decision-making, and problem-solving processes to accomplish tasks and

	fulfill responsibilities
5366.D1.6	Examine interrelationships among thinking, communication, leadership, and management processes to address family, community, and workplace issues
5366.D1.7	Demonstrate fundamentals to career success (e.g. strong work ethic, time- management, positive attitude, adaptability/flexibility, stress resilience, accountability, self-discipline, resourcefulness, cooperation, self-assessment)
Domain	***Principles of Human Development and Wellness***
5366.D2.1	Analyze principles and relationships among human development and wellness across the lifespan
5366.D2.2	Describe general patterns of physical, social, emotional, and moral development across the lifespan
5366.D2.3	Describe key developmental tasks of infancy, early childhood, middle childhood, adolescence, and early, middle, and late adulthood
5366.D2.4	Relate individual goals with developmental tasks across the lifespan, particularly during adolescence and adulthood
5366.D2.5	Identify and describe the basic components of wellness
Domain	***Impacts of Family on Human Development and Wellness***
5366.D3.1	Analyze principles of family development and wellness across the lifespan
5366.D3.2	Describe characteristics, advantages, concerns, and functions of various family structures in a diverse society
5366.D3.3	Describe characteristics and needs of individuals and families during various stages of the family life cycle
5366.D3.4	Analyze the effects of family as a system on the well-being of individuals and society
Domain	***Factors that Affect Human Development and Wellness***
5366.D4.1	Analyze factors that affect human development and wellness across the lifespan and evaluate one's own health and risk factors
5366.D4.2	Investigate impacts of hereditary, physical, psychological, biological, environmental, and social factors that influence human development and wellness across the lifespan, including intergenerational aspects
5366.D4.3	Examine connections among physical, emotional, social, and intellectual aspects of human development and wellness, including consequences of risky behaviors
5366.D4.4	Investigate effects of life events and contemporary issues on human development and wellness across the lifespan and stage of family life (i.e., unemployment, death, divorce, addictions, disorders, family violence, chronic illnesses, depression, stress, and other challenging issues)
5366.D4.5	Identify common defense mechanisms and patterns of reaction used by individuals and families in times of crisis (e.g., divorce, death, illness, unemployment, etc.)
5366.D4.6	Describe coping strategies that promote individual and family wellness in times of crisis
Domain	***Practices that Promote Human Development and Wellness***
5366.D5.1	Recommend and apply practices that promote human development and wellness throughout

	the lifespan
5366.D5.2	Demonstrate techniques for prevention and management of illness and disease, including healthy weight management
5366.D5.3	Demonstrate ways to handle stress and depression
5366.D5.4	Create plans for individual and family safety and for emergency response
5366.D5.5	Compare normal and abnormal conditions by identifying key components of assessments for wellness, including pulse and blood pressure measures; general, head- to-toe and 3-point assessments; and medical and health history
5366.D5.6	Recommend actions to take in cases of addictions, violence toward self and others, and other destructive actions
5366.D5.7	Establish and implement goals for individual wellness
Domain	***Managing Health-Related Resources and Services***
5366.D6.1	Investigate and evaluate external support systems that promote wellness practices
5366.D6.2	Evaluate current and emerging information related to human development and wellness
5366.D6.3	Survey and assess community resources, services, support groups, and opportunities that support human development and wellness when in a crisis situation (suicide, domestic violence, dating violence, bullying, death, chronic illness, etc.)
5366.D6.4	Describe the roles of social and medical support professionals, including mental health
Domain	***Career Exploration in Human Development and Wellness***
5366.D7.1	Investigate career pathways, education, and training in areas related to human development and wellness
5366.D7.2	Examine potential career paths, trends, and job market opportunities related to human development and wellness
5366.D7.3	Determine roles and functions; knowledge, skills, and attitudes; and rewards and demands associated with various careers and levels of employment related to human development and wellness
5366.D7.4	Analyze personal qualifications, interests, values, and educational preparation required for careers and employment in human development and wellness-related industries
5366.D7.5	Identify volunteer roles, part-time jobs, and entry-level positions that offer opportunities to explore careers related to human development and wellness

Preparing for College and Careers (PCC)	
Career Cluster	CTE Foundational Courses
Program of Study	
NLPS Sequence	
Course Code	5394
Course Description	*Preparing for College and Careers addresses the knowledge, skills, and behaviors all students need to be prepared for success in college, career, and life. The focus of the course is the*

	impact of today's choices on tomorrow's possibilities. Topics to be addressed include twenty-first century life and career skills; higher order thinking, communication, leadership, and management processes; exploration of personal aptitudes, interests, values, and goals; examining multiple life roles and responsibilities as individuals and family members; planning and building employability skills; transferring school skills to life and work; and managing personal resources. This course includes reviewing the 16 career clusters and Indiana's College and Career Pathways, in-depth investigation of one or more pathways, reviewing graduation plans, developing career plans, and developing personal and career portfolios. A project based approach, including computer and technology applications, cooperative ventures between school and community, simulations, and real world experiences is recommended.
Prerequisite(s)/ Corequisite(s)	None
Credits	1 to 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	Qualifies as one of the FACS courses a student can take to waive the Heath & Wellness graduation requirement. To qualify for a waiver, a student must take three of the approved courses. For more information, please see 511 IAC 6-7.1-4(c)(6)
Dual Credit Status	
Additional Notes	**When offered as applied:** 2 units maximum; counts as an employability applied unit for alternate diploma. **Note**: This course qualifies for funding at the 8th grade level
ADDITIONAL COURSE INFO	
Funding	Preparing for College and Careers | Available for 8th grade
Bulletin 400	● Any 5-12 License ● Any licensed school counselor
Rules 46-47	● Any 5-12 License ● Any Occupational Specialist License ● Any licensed school counselor
Rules 2002	● Any 5-12 License ● Any Workplace Specialist License ● Any licensed school counselor
REPA/REPA 3	● Any 5-12 License ● Any Workplace Specialist License ● Any licensed school counselor
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	

Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Exploring self***
5394.D1.1	Students evaluate personal characteristics to develop and refine a personal profile.
5394.D1.2	Identify and examine personal strengths, interests, mindsets and values about careers and work including personal motivation for work
5394.D1.3	Analyze personal aptitudes, traits, interests, attitudes, and skills and how these correlate to potential careers utilizing career exploration and research
5394.D1.4	Establish personal priorities and initial goals for life and career with attention to desired work environment, time commitment of careers of interest, etc.
5394.D1.5	Determine learning style preferences and how to apply these to lifelong learning
Domain	***Exploring Careers***
5394.D2.1	Students investigate one or more Career Clusters and Indiana's College and Career Pathways, based on individual interests, to further define career goals.
5394.D2.2	Identify high wage, high demand industries in the state of Indiana and use technology and resources to research and organize information about why these careers are categorized as high wage, high demand
5394.D2.3	Determine roles, functions, education, and training requirements of various career options within one or more careers
5394.D2.4	Describe the various reasons people seek employment
5394.D2.5	Use appropriate technology and resources to research and organize information about careers
5394.D2.6	Analyze trends, job outlook, options, and entrepreneurial endeavors for selected careers
5394.D2.7	Evaluate careers of interest for education requirements, working conditions, benefits, and opportunities for growth and change
5394.D2.8	Use appropriate technology and resources to research and organize information about career pathways in current and emerging sectors including relevant education and training needed to pursue those careers
Domain	***Exploring Postsecondary Options***
5394.D3.1	Students analyze high school and postsecondary options to know what educational opportunities are available.
5394.D3.2	Understand high school credits, GPA calculations, and how these apply to postsecondary entrance/acceptance requirements
5394.D3.3	Examine available high school programs of study aligned to career interests
5394.D3.4	Demonstrate knowledge of available opportunities to earn college credits and industry credentials in high school
5394.D3.5	Understand what work-based learning is and the advantage of participating in high school
5394.D3.6	Demonstrate understanding of multiple postsecondary educational options including on-the-

	job training, short- and long-term technical certificate programs, apprenticeship, military and two- and four-year college programs, both public and private
5394.D3.7	Demonstrate knowledge of resources available to further explore various postsecondary opportunities
5394.D3.8	Demonstrate knowledge of the cost of postsecondary educational options and various financial aid options including career scholarship accounts
Domain	***Making a Plan***
5394.D4.1	Students create flexible plans of action for achieving personal goals for high school and postsecondary.
5394.D4.2	Analyze choices, options, and the impact of life and career decisions, acknowledging that decisions made at this grade level are not permanent
5394.D4.3	Apply a decision-making process to identify short- and long-term life and career goals
5394.D4.4	Apply knowledge of high school graduation requirements to create a 4-year high school graduation plan aligned to career goals
5394.D4.5	Apply knowledge from career and education research to create an individualized career plan that incorporates career opportunities, education and/or training requirements, and financial aid support
Domain	***Success Skills***
5394.D5.1	Students demonstrate skills needed for success in personal, family, community, and career aspects of life.
5394.D5.2	Describe what it means to be career ready (ready to be successful in a college level 1st year course and ability to complete education and training to help you advance in a career)
5394.D5.3	Describe the key skills and traits needed for success in high school and beyond such as communication, collaboration, and work ethic and demonstrate these skills through various group projects and class presentations
5394.D5.4	Develop basic financial literacy skills such as saving, spending, budgets, interest, taxes, wages, salary, etc.
5394.D5.5	Understand how standards for attire, grooming, and etiquette shift depending on the setting you are in (home, school, work, etc.) and identify standards of attire in career fields of interest
5394.D5.6	Support communication and collaboration skills by incorporating diverse perspectives and experiences to meet project goals
5394.D5.7	Demonstrate fundamental skills using various technology resources and platforms when completing projects or delivering presentations (e.g., internet research, online career platforms, Microsoft Office Suite, Google Suite, Email, etc.)
5394.D5.8	Understand that digital literacy is a requirement of many careers and exhibit digital literacy skills through class projects, presentations, etc.
5394.D5.9	Understand that social media and other online platforms create a permanent digital footprint and use resources to determine consequences of digital footprints and how to use social media responsibly to limit negative consequences to future goals

Technical Math	
Career Cluster	CTE
Program of Study	
NLPS Sequence	Introductory
Course Code	7218
Course Description	*Technical Math is designed to help students develop mathematical reasoning and real-world skills in analyzing verbal and written descriptions, translating them into algebraic, geometric, trigonometric, and statistical statements and applying them to solve problems in fabrication, manufacturing, and business. The course will include at least six lab activities or projects to allow faculty and students to apply mathematics principles to work-related situations.*
Prerequisite(s)/ Corequisite(s)	Algebra I
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Business Education with Shorthand 7-12 ● Mathematics 7-12
Rules 46-47	● Business Education 9-12 ● Mathematics 9-12
Rules 2002	● Business with high school setting ● CTE: Business Services & Technology with high school setting ● Mathematics
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information ● Technology 5-12 ● Mathematics 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	

Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Numerical and Proportional Reasoning***
7218.D1.1	Students will use number sense and proportional reasoning in real-world scenarios to make and communicate decisions in order to draw conclusions.
7218.D1.2	Use estimation to identify the most reasonable mathematical solution.
7218.D1.3	Use estimation and precision in real-world scenarios - know when, know how, (e.g., use benchmarks for estimating), know why.
7218.D1.4	Solve real-world problems and interpret results involving calculations with percentages, decimals, and fractions - conversions (e.g., percent to fraction or decimal, fraction to decimal or percent, decimal to fraction or percent), percent change, percent of quantities.
7218.D1.5	Recognize, set up, and solve proportions from real-world scenarios.
7218.D1.6	Utilize real-world scenarios requiring interpretation and comparison of various representations of rates, ratios, and proportions including scale drawings.
7218.D1.7	Compare magnitudes of numbers in context in different forms (e.g., place value, Richter scale, scientific notation, powers of 10)
7218.D1.8	Use dimensional analysis to solve problems involving multiple units of measurement (e.g., convert between and within the metric system and the U.S. customary system, determine miles per gallon, appropriate dosages of medicine).
Domain	***Mathematical Processes and Models***
7218.D2.1	Students will use mathematical processes and models to acquire, demonstrate, and communicate mathematical understanding in real-world scenarios.
7218.D2.2	Apply mathematics to problems arising in everyday life, workplace, and society.
7218.D2.3	Use mathematical processes with algebraic formulas (e.g., literal equations, numerical techniques, and graphs to solve real-world scenarios.
7218.D2.4	Create mathematical models and use problem-solving skills, independently and as a collaborative team, for real-world scenarios to analyze given information or data, identify patterns or relationships, formulate a plan or strategy, estimate solutions, determine a solution, justify a solution and its reasonableness, describe limitations, identify how results are affected by changing parameters, (e.g., cost of materials, cost of labor, work time required to improve the overall cost of a project), and suggest improvements.
7218.D2.5	Select appropriate tools (e.g., real objects, manipulatives, paper and pencil, technology) and techniques (e.g., mental math, estimation, number sense) to solve problems.
7218.D2.6	Demonstrate effective use of resources (e.g., faculty, other students, reference materials,

	industry resources, the internet).
7218.D2.7	Use precise mathematical language and multiple representations (e.g., symbols, diagrams, graphs, written language) to communicate, independently and as a collaborative team, written or orally (e.g., reports, presentations, demonstrations), mathematical ideas or solutions to real-world scenarios.
Domain	***Algebraic Relationships***
7218.D3.1	Students will use mathematical concepts to algebra to explain linear and non-linear applications in real-world scenarios.
7218.D3.2	Analyze and apply rate of change in terms of real-world scenarios (e.g., rise and run of stair stringers, roof pitch).
7218.D3.3	Use concepts of systems of equations and inequalities (e.g., tables, graphs, matrix operations, pictorial representations, or algebraic properties) to model and solve real-world scenarios (e.g., compare 'best deal opportunities' with profit and expenses in business).
7218.D3.4	Use linear programming with or without the use of technology to maximize or minimize (optimize) linear objective function in real-world scenarios and determine the reasonableness of solutions.
7218.D3.5	Collect and organize data, independently and as a collaborative team, to create appropriate graphical representations (e.g., scatterplots, histograms, box plots, circle graphs) or real-world scenarios - interpret graphical representation, make predictions and decisions based on representations, and analyze results based on representations.
7218.D3.6	Create, interpret, and analyze best-fit models of linear, exponential, and quadratic functions to solve real-world scenarios - interpret the constants, coefficients, and bases in the context of data; check the model for best fit and use of the model, where appropriate, to draw conclusions of make predictions.
Domain	***Measurement***
7218.D4.1	Students will apply measurement and use measurement tools in real-world scenarios.
7218.D4.2	Convert between and within the metric system and the U.S. customary system in real-world scenarios.
7218.D4.3	Apply accurate readings of both metric and the U.S. customary measuring devices to a problem situation.
7218.D4.4	Select and use appropriate measuring devices (e.g., rules, tape measures, calipers, gauges) and understand the limitations of such devices (e.g., flat surfaces, curved surfaces) for real-world scenarios.
7218.D4.5	Determine and use appropriate unit labels (e.g., length, distance, area, surface area, volume, weight, voltage, resistance, pressure, density) for real-world scenarios.
Domain	***Geometry***
7218.D5.1	Students will apply geometric concepts to real-world scenarios.
7218.D5.2	Identify various geometric figures in order to identify what formulas are needed to solve situational problems (e.g., decompose and arrange geometric figures).
7218.D5.3	Compute measurements of geometric figures such as area, surface area (including area of sectors), volume perimeter, and circumference (including arc length) for real-world scenarios.

7218.D5.4	Use trigonometric ratios (e.g., sine, cosine, tangent) to calculate angles and lengths of sides in real-world scenarios.
7218.D5.5	Analyze how changing dimensions will affect the perimeter, circumference, area, surface area, or volume in real-world scenarios.
7218.D5.6	Determine the role angles play in a situational problem (e.g., structural strength and stability, angle straps for lifting, angles used to cut hair).
7218.D5.7	Apply right-triangle relationships using Pythagorean Theorem, special right triangles, and trigonometry in real-world scenarios (e.g., roof construction, building the frame of a car, calculating machined parts).
7218.D5.8	Draw and interpret with or without the use of technology - auxiliary views, orthographic views, isometric views (e.g., house plans, engineering drawings, fashion design).
7218.D5.9	Use cross-sections of three-dimensional shapes to relate to two-dimensional figures.
7218.D5.10	Describe the transformation of polygons in the coordinate plane as they relate to real-world scenarios (e.g., cookie cutting, fabric cutting, machine dies) - translation, reflection, rotation, dilation.

CTE Nonstandard Courses

CTSO Leadership Development in Action	
Career Cluster	CTE Nonstandard Courses
Program of Study	
NLPS Sequence	
Course Code	5237
Course Description	*Leadership Development in Action is a project-based course in which students integrate higher order thinking, communication, leadership, and management processes to conduct Career and Technical Student Organization (CTSO) leadership projects at the local, state, or national level. Each student will create a vision statement, establish standards and goals, design and implement an action plan and timeline, reflect on accomplishments, and evaluate results.* *Authentic, independent application through CTSO student-directed programs or projects, internship, community-based study, or in-depth laboratory experience is required. Research and development, interdisciplinary projects, and/or collaboration with postsecondary faculty, community agencies, or organizations are appropriate approaches.* ***Instructor must be a current chapter advisor of an Indiana-recognized CTSO. State and national membership in an Indiana recognized CTSO is required of any student enrolled in this course.*** *Service learning experiences are highly recommended. Achievement of applicable Career and Technical Education (CTE), academic, and employability standards will be documented through a required student portfolio.*
Prerequisite(s)/ Corequisite(s)	None Recommended: Preparing for College and Careers; sequence of courses relevant to the student's CTSO and area of concentration; or permission of instructor through an application process
Credits	1 credit per semester, up to 6 semesters, 6 credits maximum
Counts Toward	
Dual Credit Status	X
Additional Notes	Note: Can only be offered at schools with officially registered CTSO chapters and must be taught by the registered Advisor of that CTSO Chapter. Students MUST be members of the state and national CTSO.
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Appropriate Vocational License AND local CTSO chapter advisor ● Occupational Specialist II license in related area
Rules 46-47	● Appropriate Vocational License AND local CTSO chapter advisor ● Occupational Specialist II license in related area

Rules 2002	● Appropriate CTE License with high school setting AND local CTSO chapter advisor ● Workplace Specialist II license in related area
REPA/REPA 3	● Appropriate CTE License 5-12 AND local CTSO chapter advisor ● Workplace Specialist II license in related area
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Career & Technical Education Pilot Course: (Insert title descriptive of course content)	
Career Cluster	CTE Nonstandard Courses
Program of Study	
NLPS Sequence	
Course Code	5239
Course Description	*Career and Technical Education Pilot Course is a course title that would be used for enrollment reporting purposes by schools that are piloting a new Career and Technical Education course.* ***Schools must apply to the Indiana Department of Education for a non-standard course waiver and propose a course description and standards, explain how the pilot course relates to an existing or innovative pathway, and provide a rationale describing business and industry need and support.*** *Schools are to follow the pilot course framework and provide feedback at the end of the pilot year on that framework to the Department and the related pathway panel.*
Prerequisite(s)/ Corequisite(s)	Determined by the CTE Nonstandard Course Waiver
Credits	1 semester course, up to 3 credits per semester, may be offered for successive semesters up to 12 credits

Counts Toward	Determinded via the CTE Nonstandard Course Waiver process	
Dual Credit Status		
Additional Notes	**Note:** This course requires an approved CTE Nonstandard Course Waiver	
ADDITIONAL COURSE INFO		
Funding	Pilot	
Bulletin 400	● Licensing per NonStandard Course Wavier	
Rules 46-47	● Licensing per Non-Standard Course Wavier	
Rules 2002	● Licensing per Non-Standard Course Wavier	
REPA/REPA 3	● Licensing per Non-Standard Course Wavier	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	

Locally Created CTE Concentrator							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7392	CTE Principles Course:	7393	CTE Concentrator A:	7394	CTE Concentrator B:	7395	CTE Capstone

Career & Technical Education Principles Course (Insert title descriptive of course content)		
Career Cluster	CTE Nonstandard Courses	
Program of Study		
NLPS Sequence		
Course Code	7392	
Course Description	*Career and Technical Education Principles Course is a course title that would be used for enrollment reporting purposes by schools that are offering a locally created CTE Concentrator Sequence**. Schools must apply to Career and Technical Education at the Indiana Commission for Higher Education for a non-standard course waiver** and propose a course description and standards, explain how the locally created concentrator program is an innovative pathway, and provide a rationale describing business and industry need and support. Schools are to follow the NLPS course framework.*	
Prerequisite(s)/ Corequisite(s)	Determined by the CTE Nonstandard Course Waiver	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits max	
Counts Toward	Determinded via the CTE Nonstandard Course Waiver process	
Dual Credit Status		
Additional Notes	**Note:** This course requires an approved CTE Nonstandard Course Waiver **When offered as applied:** 2 units maximum; counts as an employability applied unit for alternate diploma	
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value: Eligible for Appeal	Level I
Bulletin 400	● Licensing per NonStandard Course Wavier	
Rules 46-47	● Licensing per Non-Standard Course Wavier	
Rules 2002	● Licensing per Non-Standard Course Wavier	
REPA/REPA 3	● Licensing per Non-Standard Course Wavier	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		

VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
	Competencies must be submitted by the proposing school during the nonstandard course waiver application process.

Career & Technical Education Concentrator A: (Insert title descriptive of course content)		
Career Cluster	CTE Nonstandard Courses	
Program of Study		
NLPS Sequence		
Course Code	7393	
Course Description	*Career and Technical Education Concentrator A Course is a course title that would be used for enrollment reporting purposes by schools that are offering a locally created CTE Concentrator Sequence.* ***Schools must apply to Career and Technical Education at the Indiana Commission for Higher Education for a non-standard course waiver*** *and propose a course description and standards, explain how the locally created concentrator program is an innovative pathway, and provide a rationale describing business and industry need and support. Schools are to follow the approved course framework.*	
Prerequisite(s)/ Corequisite(s)	Determined by the CTE Nonstandard Course Waiver	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits max	
Counts Toward	Determinded via the CTE Nonstandard Course Waiver process	
Dual Credit Status		
Additional Notes	**Note:** This course requires an approved CTE Nonstandard Course Waiver **When offered as applied:** 2 units maximum; counts as an employability applied unit for alternate diploma	
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value: Eligible for Appeal	Level I

Bulletin 400	● Licensing per NonStandard Course Wavier
Rules 46-47	● Licensing per Non-Standard Course Wavier
Rules 2002	● Licensing per Non-Standard Course Wavier
REPA/REPA 3	● Licensing per Non-Standard Course Wavier
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
	Competencies must be submitted by the proposing school during the nonstandard course waiver application process.

Career & Technical Education Concentrator B: (Insert title descriptive of course content)	
Career Cluster	CTE Nonstandard Courses
Program of Study	
NLPS Sequence	
Course Code	7394
Course Description	*Career and Technical Education Concentrator B Course is a course title that would be used for enrollment reporting purposes by schools that are offering a locally created CTE Concentrator Sequence.* ***Schools must apply to Career and Technical Education at the Indiana Commission for Higher Education for a non-standard course waiver*** *and propose a course description and standards, explain how the locally created concentrator program is an innovative pathway, and provide a rationale describing business and industry need and support. Schools are to follow the approved course framework.*
Prerequisite(s)/ Corequisite(s)	Determined by the CTE Nonstandard Course Waiver
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits max

Counts Toward	Determinded via the CTE Nonstandard Course Waiver process	
Dual Credit Status		
Additional Notes	**Note:** This course requires an approved CTE Nonstandard Course Waiver **When offered as applied:** 2 units maximum; counts as an employability applied unit for alternate diploma	
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value: Eligible for Appeal	Level I
Bulletin 400	● Licensing per NonStandard Course Wavier	
Rules 46-47	● Licensing per Non-Standard Course Wavier	
Rules 2002	● Licensing per Non-Standard Course Wavier	
REPA/REPA 3	● Licensing per Non-Standard Course Wavier	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
	Competencies must be submitted by the proposing school during the nonstandard course waiver application process.	

Career & Technical Education Capstone: (Insert title descriptive of course content)	
Career Cluster	CTE Nonstandard Courses
Program of Study	
NLPS Sequence	
Course Code	7395
Course	*Career and Technical Education Capstone Course is a course title that would be used for*

Description	*enrollment reporting purposes by schools that are offering a locally created CTE Concentrator Sequence**. Schools must apply to Career and Technical Education at the Indiana Commission for Higher Education for a non-standard course waiver** and propose a course description and standards, explain how the locally created concentrator program is an innovative pathway, and provide a rationale describing business and industry need and support. Schools are to follow the approved course framework.*
Prerequisite(s)/ Corequisite(s)	Determined by the CTE Nonstandard Course Waiver
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits max
Counts Toward	Determinded via the CTE Nonstandard Course Waiver process
Dual Credit Status	
Additional Notes	**Note:** This course requires an approved CTE Nonstandard Course Waiver **When offered as applied:** 6 units maximum; counts as an employability applied unit for alternate diploma

ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value: Eligible for Appeal	Level II
Bulletin 400	● Licensing per NonStandard Course Wavier	
Rules 46-47	● Licensing per Non-Standard Course Wavier	
Rules 2002	● Licensing per Non-Standard Course Wavier	
REPA/REPA 3	● Licensing per Non-Standard Course Wavier	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
	Competencies must be submitted by the proposing school during the nonstandard course waiver application process.

Work-Based Learning

Cooperative Education (Applied Cooperative Education)	
Career Cluster	CTE WBL
Program of Study	
NLPS Sequence	
Course Code	6162
Course Description	*Cooperative Education is an approach to employment training that spans all career and technical education program areas through school-based instruction and on the job training. The course combines time spent on workplace activities and time spent doing school-based instruction, focused on employability skills development. Additionally, all state and federal laws and regulations related to student employment and cooperative education must be followed.*
Prerequisite(s)/ Corequisite(s)	Recommended Prerequisites: Preparing for College and Careers; two credits in a career and technical education pathway course
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum A minimum of 75 hours spent on workplace activities **and** 75 hours of classroom instruction are required for the first credit. Each additional credit requires a minimum of 75 additional work hours. There is no requirement for additional RTI hours for credits after the first.
Counts Toward	
Dual Credit Status	
Additional Notes	Course is funded at a flat rate of $150; When offered as applied: 6 units maximum; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	Preparing for College and Careers
Bulletin 400	● Any license ● Trade & Industrial Cooperative Teacher Coordinator
Rules 46-47	● Any license ● ICE Endorsement ● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Any licensed school counselor ● Any CTE license or Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● Any licensed school counselor ● Any CTE license or Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course	

Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Career Exploration and Development***
6162.D1.1	Assess personal skills, abilities, aptitudes, strengths, and weaknesses as they relate to career exploration and development.
6162.D1.2	Explore and research multiple career pathways related to a field of interest and set career goals.
6162.D1.3	Analyze personal characteristics, abilities, knowledge, and skills needed for career success in chosen career pathway.
6162.D1.4	Engage in a continuous learning process related to career goals while actively seeking out and participating in a work-, service-, or project-based learning experience.
6162.D1.5	Acquire occupational-related skills through work-, service-, or project-based learning experiences.
6162.D1.6	Evaluate how personal attitudes and values integrate into career choices.
Domain	***Personal Qualities of Success***
6162.D2.1	Understand and apply the personal qualities that affect success.
6162.D2.2	Continue to practice responsible and ethical decision-making affecting personal and professional relationships and consider the consequences of unethical decision-making.
6162.D2.3	Demonstrate integrity and self-control in work-, service-, or project-based learning experiences.
6162.D2.4	Complete tasks or activities with no prompting and minimal guidance.
6162.D2.5	Demonstrate perseverance through work-, service-, or project-based learning experiences.
6162.D2.6	Clarify goals, develop a timeline, and determine most effective strategies to complete goals on time.
6162.D2.7	Apply coping strategies to mitigate stressful change while continuing to meet expectations at home, school, and in workplace.
6162.D2.8	Demonstrate an eagerness to learn new responsibilities or improve in current responsibilities.
6162.D2.9	Demonstrate personal accountability and work productivity.

6162.D2.10	Exhibit initiative in learning new skills and improving workplace skills.
6162.D2.11	Examine personal, wellness, and stress management strategies.
6162.D2.12	Show professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, following policies, rules and regulations, and taking responsibility for creating a safe, positive work environment.
6162.D2.13	Exhibit leadership and responsibility in the professional setting.
6162.D2.14	Demonstrate confidence by taking risks to introduce new ideas or processes for work.
6162.D2.15	Evaluate feedback to improve job performance.
6162.D2.16	Demonstrate a positive customer/client attitude.
6162.D2.17	Utilize appropriate etiquette for various occasions.
Domain	***Employability and Professional Skills***
6162.D3.1	Utilize effective communication and interpersonal skills.
6162.D3.2	Write a well-organized document using supporting data to clarify complex ideas, raise relevant questions, or solve problems using varied media formats.
6162.D3.3	Apply effective speaking and listening to foster positive relationships and communicate key concepts to a variety of audiences.
6162.D3.4	Deliver oral presentations using technology and professional etiquette to a variety of audiences.
6162.D3.5	Demonstrate information, communications, and technology literacy.
6162.D3.6	Collaborate effectively with team members (classroom or the workplace).
6162.D3.7	Demonstrate critical thinking and problem solving in the professional setting.
6162.D3.8	Develop skills to give and receive constructive criticism.
6162.D3.9	Evaluate feedback to improve job performance and create professional work habits.
6162.D3.10	Generate solutions critiqued with reason, logic, and inferences about alternatives.
6162.D3.11	Analyze potential solutions with a set of criteria including the goal, previous knowledge and experience, diverse perspectives, and data.
Domain	***Workplace Safety and Practices***
6162.D4.1	Understand workplace safety and workplace practices.
6162.D4.2	Identify causes of accidents and apply safety procedures to prevent accidents.
6162.D4.3	Analyze discrimination and harassment laws and give examples of each.
6162.D4.4	Maintain confidentiality and integrity.
6162.D4.5	Summarize emergency preparedness plans for chosen career pathway.
6162.D4.6	Examine workplace regulations, health and safety guidelines, and inspections for chosen career pathway.
6162.D4.7	Analyze licensure requirements for facilities and employees in chosen career pathway.
Domain	***Transitioning to Career***
6162.D5.1	Develop strategies for effective transition from high school to career.
6162.D5.2	Explore and understand a variety of postsecondary education and training options, including

	transfer opportunities, and how they support future plans.
6162.D5.3	Re-evaluate career pathway plan to determine appropriate postsecondary educational options.
6162.D5.4	Demonstrate skills in revising and extending career plans to meet postsecondary goals.
6162.D5.5	Develop skills to assess career goals in terms of work conditions, benefits, and opportunities for advancement.
6162.D5.6	Prepare a formal search, application, and interview using the latest trends.
6162.D5.7	Understand the employment application and interviewing process and develop effective interviewing techniques.
6162.D5.8	Prepare and update a career portfolio based on a career pathway plan, which includes a resume, sample cover letters, letters of recommendation, examples of work and technical skills, internship or work experience summaries, validation of work/internship experience, industry certifications, documentation of extracurricular and community service activities, and awards.
6162.D5.9	Understand the importance of networking for enhancing achievement of education and career goals.
6162.D5.10	Understand and be able to complete employment documents – W2, proof of eligibility to work, benefits packages.
6162.D5.11	Research and evaluate options for covering the costs of education and training.
6162.D5.12	Create a comprehensive five-year career goal plan utilizing the skills developed in this course.
Domain	***Personal Financial Responsibility***
6162.D6.1	Develop understanding of relationship between income, benefits, and tax calculations on pay stub.
6162.D6.2	Planning and managing money – create a budget, system for keeping and using financial records.
6162.D6.3	Identify strategies and considerations for making purchasing decisions.
6162.D6.4	Identify and utilize best practices for managing credit and debt of personal accounting.
6162.D6.5	Explore and identify factors to consider when balancing risk management and insurance costs.
6162.D6.6	Identify and explore different avenues for saving and investing and how they impact short- and long-term income.

Technical Skills Development	
Career Cluster	CTE WBL
Program of Study	
NLPS Sequence	
Course Code	7156
Course Description	*The Technical Skills Development course may be used to provide students with the opportunity to apply the technical knowledge and skills learned in a Concentrator A or B course through*

	additional real world learning experiences such as lab activities, project based learning or a work-based learning experience. Students must be co-enrolled in a Concentrator A and/or B course in order to be enrolled in the Technical Skills Development course.
Prerequisite(s)/ Corequisite(s)	Concurrently enrolled in a Next Level Programs of Study Concentrator A and/or B course.
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum per program of study. A minimum of 75 hours of workplace activities are required for one credit; 150 hours are required for two credits.
Counts Toward	
Dual Credit Status	
Additional Notes	May be used by a student more than once as long as it is with separate programs of study **When offered as applied:** 2 units maximum per program of study; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	Introductory
Bulletin 400	● Trade & Industrial Cooperative Teacher Coordinator ● Distributive Education K-12 ● Vocational Agriculture K-12 ● Vocational Business & Office Education ● Vocational Home Economics
Rules 46-47	● ICE Endorsement ● Any Agribusiness license 9- 12 ● Business Education with Vocational Business Endorsement 9-12 ● Any Standard Health Occupations license 9-12 ● Any Standard Trade & Industrial license 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Any CTE license with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● Any CTE License 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	

Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
	Please refer to course standards from student's prior courses

Work Based Learning Capstone (Applied Work-Based Learning Capstone)	
Career Cluster	CTE WBL
Program of Study	
NLPS Sequence	
Course Code	5974
Course Description	*WBL Capstone is a stand-alone course that prepares students for college and/or a career. This course occurs in real or simulated workplace settings and involves an employer assigning a student meaningful job tasks to develop his or her skills, knowledge, and readiness for work. A clear partnership agreement and training plan is developed by the student, parent or guardian, school, and employer partner to guide the student's work-based experiences and assist in evaluating achievement and performance. Related instruction shall be organized and planned around the activities associated with the student's individual job and career objectives in a pathway and shall be taught either on-the-job or in a classroom setting during the same semester the student is participating in the work-based experience. For a student to become employable, the related instruction should cover: (a) employability skills, and (b) specific occupational competencies.*
Prerequisite(s)/ Corequisite(s)	Complete at least one advanced career and technical education course from a program of study. Worksite placement must align to the student pathway
Credits	1 semester course, 1-3 credits per semester, 6 credits maximum. A minimum of 75 hours of On-the-Job Training (OJT) are required for one credit; 150 hours are required for two credits. Time spent on workplace activities must be aligned to the student's program of study. There is no requirement for additional coursework beyond the workplace activities due to the course's prerequisite.
Counts Toward	
Dual Credit Status	

Additional Notes	Course is funded at a flat rate of $500; No longer counts toward concentrator status. **When offered as applied:** 6 units maximum; counts as an employability applied unit, capstone course, or elective for alternate diploma
ADDITIONAL COURSE INFO	
Funding	WBL
Bulletin 400	● Any license ● Trade & Industrial Cooperative Teacher Coordinator
Rules 46-47	● Any license ● Occupational Specialist I, II or III in related course approved for a CTE pathway ● ICE Endorsement
Rules 2002	● Any licensed school counselor ● Any CTE license or Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● Any licensed school counselor ● Any CTE license or Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
	Please refer to course standards from student's prior courses

Career Exploration Internship (Applied Career Exploration Internship)	
Career Cluster	CTE WBL
Program of Study	
NLPS Sequence	
Course Code	0530
Course	*The Career Exploration Internship (CEI) course consists of a paid or unpaid work experience in*

Description	*the public or private sector that provides for workplace learning in an area of student career interests. Unlike the Work-Based Learning Capstone course in which students gain expertise in a specific occupation, CEI is intended to expose students to broad aspects of a particular industry or career cluster area by rotating through a variety of work sites or departments. In addition to their workplace learning activities, students participate in (1) regularly scheduled meetings with their classroom teacher, or (2) a regularly scheduled seminar with the teacher for the purpose of helping students make the connection between academic learning and their work-related experiences.* *A clear partnership agreement and training plan is developed by the student, parent or guardian, school, and employer partner to guide the student's work-based experiences and assist in evaluating achievement and performance. Specific instructional standards tied to the career cluster or pathway and learning objectives for the internship must be written to clarify the expectations of all parties.*
Prerequisite(s)/ Corequisite(s)	None Recommended: Preparing for College and Careers
Credits	A minimum of 75 hours of On-the-Job Training (OJT) are required for one credit; 150 hours of OJT are required for two credits. There is a requirement of 18 hours of seminar coursework which connects the student's academic coursework to the Work-Based Learning experience. These coursework hours are in addition to the 75 hours of OJT. The student should complete academic coursework connected to the WBL experience and aligned to the student's career interests prior to utilizing this course code.
Counts Toward	
Dual Credit Status	
Additional Notes	**Note**: This course is funded at a flat rate of $500 **When offered as applied**: 4 units maximum; counts as an employability applied unit for alternate diploma
ADDITIONAL COURSE INFO	
Funding	WBL
Bulletin 400	● Trade & Industrial Cooperative Teacher Coordinator ● Distributive Education K-12 ● Vocational Agriculture K-12 ● Vocational Business & Office Education ● Vocational Home Economics ● Any License 5-12 with Work-based Learning experience or training ● Workplace Specialist I or II in related course approved for a CTE pathway ● Any licensed school counselor
Rules 46-47	● ICE Endorsement ● Any Agribusiness license 9- 12 ● Business Education with Vocational Business Endorsement 9-12

	● Any Standard Health Occupations license 9-12 ● Any Standard Trade & Industrial license 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway ● Any License 5-12 with Work-based Learning experience or training ● Workplace Specialist I or II in related course approved for a CTE pathway ● Any licensed school counselor
Rules 2002	● Any license with high school setting and Work-based Learning experience or training ● Workplace Specialist I or II in related course approved for a CTE pathway ● Any licensed school counselor
REPA/REPA 3	● Any License 5-12 with Work-based Learning experience or training ● Workplace Specialist I or II in related course approved for a CTE pathway ● Any licensed school counselor
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
	Please refer to course standards from student's prior courses

Apprenticeship	
Career Cluster	CTE WBL
Program of Study	
NLPS Sequence	
Course Code	6148
Course	*Apprenticeships are defined as intensive work-based learning opportunities that generally last*

Description	*from one to six years and provide a combination of on-the-job training and formal classroom instruction. They are intended to support progressive skill acquisition and lead to postsecondary credentials and, in some cases, degrees. Apprenticeships often involve 2,000 to 10,000 on-the-job hours. Students 16-years-old or older may qualify for an apprenticeship. Per the Indiana General Assembly, any apprenticeship program must be registered under the federal National Apprenticeship Act (29 U.S.C. 50 et seq.) or another federal apprenticeship program.*
Prerequisite(s)/ Corequisite(s)	Dependent on program requirements
Credits	1 semester course, may be taken for successive semesters (12 credits maximum). A minimum of 75 hours of workplace and classroom activities are required for one credit; 150 hours are required for two credits.
Counts Toward	
Dual Credit Status	X
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	WBL
Bulletin 400	● Trade & Industrial Cooperative Teacher Coordinator ● Distributive Education K-12 ● Vocational Agriculture K-12 ● Vocational Business & Office Education ● Vocational Home Economics
Rules 46-47	● ICE Endorsement ● Any Agribusiness license 9- 12 ● Business Education with Vocational Business Endorsement 9-12 ● Any Standard Health Occupations license 9-12 ● Any Standard Trade & Industrial license 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Any CTE license with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● Any CTE License 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	

Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
	Please refer to course standards from student's prior courses and from the Apprenticeship Program

Youth Apprenticeship	
Career Cluster	CTE WBL
Program of Study	
NLPS Sequence	
Course Code	6149
Course Description	*Youth apprenticeships are intensive, paid, Work-Based Learning experiences, which utilize a combination of on-the-job (OJT) and classroom related technical instruction (RTI). Youth Apprenticeships may take a variety of forms, including Pre-Apprenticeships, Modern Youth Apprenticeships, and apprenticeships focused on youth that are not federally registered. Youth Apprenticeships, in any form, should support progressive skill acquisition and lead to postsecondary or industry credentials.*
Prerequisite(s)/ Corequisite(s)	None Recommended: None
Credits	1 semester course, may be taken for successive semester (12 credits maximum, 6 per year) A minimum of 75 hours of On-the-Job Training (OJT) are required for per credit.
Counts Toward	
Dual Credit Status	
Additional Notes	**Note**: This course is funded at a flat rate of $500 **This course code should primarily be used when an apprenticeship is not aligned to a CTE program of study.**
ADDITIONAL COURSE INFO	
Funding	WBL
Bulletin 400	● Trade & Industrial Cooperative Teacher Coordinator ● Distributive Education K-12

	● Vocational Agriculture K-12 ● Vocational Business & Office Education ● Vocational Home Economics ● Any License 5-12 with Work-based Learning experience or training ● Workplace Specialist I or II in related course approved for a CTE pathway ● Any licensed school counselor
Rules 46-47	● ICE Endorsement ● Any Agribusiness license 9- 12 ● Business Education with Vocational Business Endorsement 9-12 ● Any Standard Health Occupations license 9-12 ● Any Standard Trade & Industrial license 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway ● Any License 5-12 with Work-based Learning experience or training ● Workplace Specialist I or II in related course approved for a CTE pathway ● Any licensed school counselor
Rules 2002	● Any license with high school setting and Work-based Learning experience or training ● Workplace Specialist I or II in related course approved for a CTE pathway ● Any licensed school counselor
REPA/REPA 3	● Any License 5-12 with Work-based Learning experience or training ● Workplace Specialist I or II in related course approved for a CTE pathway ● Any licensed school counselor
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
	Please refer to course standards from student's prior courses

Digital Applications and Responsibility (Applied Digital Applications and Responsibility)	
Career Cluster	Digital Technology
Program of Study	
NLPS Sequence	
Course Code	4528
Course Description	*Digital Applications and Responsibility prepares students to use technology in an effective and appropriate manner in school, a job, or everyday life. Students develop skills related to word processing, spreadsheets, presentations, and communications software. Students learn what it means to be a good digital citizen and how to use technology, including social media, responsibly. Students expand their knowledge of how to use digital devices and software to build decision-making and problem-solving skills. Students should be provided with the opportunity to seek industry-recognized digital literacy certifications.*
Prerequisite(s)/ Corequisite(s)	
Credits	1 to 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	
Bulletin 400	● Business Education 7-12
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5- 12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Interactive Media 9-12 ● Workplace Specialist: Graphic Imaging Technology 9-12 ● Workplace Specialist: Computer Illustration & Graphics 9-12 ● Workplace Specialist: Graphic Design and Layout 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	

VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Technology as a Planning and Productivity Tool***
4528.D1.1	Students integrate technology to arrange materials and solve problems efficiently
4528.D1.2	Apply technology to create business, industry, and professional tasks and develop strategies for solving problems
4528.D1.3	Use appropriate technology to plan, develop, edit, and present material to different types of audiences both in a group or individually (i.e., paper, web page, multimedia presentation, publications, speech, hypermedia, etc.)
4528.D1.4	Integrate information and communication technology to analyze a real-world problem, design and implement procedures to monitor information, set timelines, and evaluate progress toward the solution
4528.D1.5	Using appropriate handling and use of supplies and equipment, practice respectful and responsible use of technology through abiding by the professional practices
4528.D1.6	Apply an understanding of plagiarism and fair use; respect copyright laws of information producers such as authors and artists, including website developers
Domain	***Document Processing***
4528.D2.1	Students design documents by using complex features of software to develop advanced documents that are user-friendly
4528.D2.2	Create and manage master documents and subdocuments by using various edit tools, formatting tools, and templates
4528.D2.3	Use advanced features to create combo boxes, macros, newsletters with mastheads, multi-column brochures, multi-page books, forms wizards, composition, table of contents, and mail merge
4528.D2.4	Explain the use of various document types and how they related to different situations (school, work, home, etc.)
4528.D2.5	Demonstrate saving, opening, and finding files in various formats and the ability to follow instructions
Domain	***Spreadsheet Software***
4528.D3.1	Students apply concepts of spreadsheet software to organize and manipulate data

4528.D3.2	Use industry terminology when using spreadsheet software
4528.D3.3	Apply relative, absolute, mixed cell references and advanced features (i.e. naming ranges; track, accept and reject changes; formatting, filtering, and protection) in formulas and printing
4528.D3.4	Create and evaluate formulas and functions; customize formats; pivot tables and charts; and edit and run command buttons, macros, and macros with buttons
4528.D3.5	Edit and label chart components (i.e. axis, legends, titles, and databases)
4528.D3.6	Link and merge worksheets/workbooks; importing and exporting data to and from spreadsheets
Domain	***Presentation Software***
4528.D4.1	Students create a variety of multi-media presentations using appropriate design principles to communicate in a professional manner
4528.D4.2	Demonstrate how electronic presentations are created
4528.D4.3	Apply Industry design guidelines to create, manipulate and enhance visual presentations
4528.D4.4	Demonstrate presentation skills by creating well-organized, audience-appropriate presentations such as informative, entertaining, instructional, while using proper public speaking techniques
4528.D4.5	Create a stand-alone presentation with video, embedded objects, specialized features, by modifying and designing templates
Domain	***Database Software***
4528.D5.1	Students synthesize database management concepts to manage, evaluate, and organize information in an effective manner
4528.D5.2	Create database objects such as tables, forms, and queries
4528.D5.3	Use advanced functions to filter, extract, and split databases and cross reference
4528.D5.4	Use a database application software to create or modify a database structure, enter records in a database, create reports, sort, and index a database
Domain	***Internet Tools***
4528.D6.1	Students establish communication and collaboration skills using the internet and social media to increase global awareness
4528.D6.2	Construct basic HTML5 coding
4528.D6.3	Apply and adapt best practices for internet research
4528.D6.4	Investigate the effects of social media tools on society
4528.D6.5	Explain concepts of internet privacy and security
Domain	***Technology Assessment***
4528.D7.1	Students apply technology concepts to take industry standard certifications
4528.D7.2	Investigate industry-based certifications within the information technology industry
4528.D7.3	Take computer-based narrative tests and computer adaptive timed tests for topic remediation and support
Domain	***Functions of Technology***
4528.D8.1	Students connect functions of technology with computer hardware and software, so they

	make decisions about computer technology
4528.D8.2	Identify the principal hardware components of a microcomputer and describe their functions
4528.D8.3	Use operating system utilities to control the operation of the computer
4528.D8.4	Investigate security risks and how to prevent or resolve security issues
4528.D8.5	Recognize and explain compatibility issues and common errors
4528.D8.6	Assess the risk associated with upgrading technology
4528.D8.7	Identify preventative maintenance products and techniques
4528.D8.8	Establish knowledge of computer technology in relationship to networks

Digital Technology

Information Technology: Special Topics		
Career Cluster	Digital Technology	
Program of Study		
NLPS Sequence		
Course Code	4578	
Course Description	*Information Technology: Special Topics is an extended learning experience designed to address the advancement and specialization of careers within the career cluster through the provision of a specialized course for a specific workforce need in the school's region. The learning experience is at a qualified site, and is designed to give the student the opportunity to learn and practice technical skills; while working under the direction of the appropriately licensed professional. Throughout the course, students will focus on learning about employment opportunities and obtaining the knowledge, skills and attitudes essential for success in specific occupations. Course standards and curriculum must be tailored to the specific profession, preparing students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. Participation in a related CTSO encourages the development of leadership, communication and career related skills, and opportunities for community service.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits	
Counts Toward		
Dual Credit Status	X	
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.	
ADDITIONAL COURSE INFO		
Funding	Pilot	
Bulletin 400	● Industrial Arts 7-12, K12 ● Appropriate Vocational License	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Appropriate Vocational license ● Occupational Specialist in related course approved for a CTE pathway	
Rules 2002	● Technology Education with high school setting ● Appropriate CTE License with high school setting	

	● Workplace Specialist in related course approved for a CTE pathway
REPA/REPA 3	● Technology Education 5-12 ● Appropriate CTE License 5-12 ● Workplace Specialist in related course approved for a CTE Pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	

Introduction to Computer Science and Digital Technology	
Career Cluster	Digital Technology
Program of Study	
NLPS Sequence	Introductory
Course Code	4803
Course Description	*Introduction to Computer Science and Digital Technology allows students to explore the world of computer science and digital technology. Students will gain a broad understanding of the areas composing computer science and digital technology. Specifically, there is a focus on the areas of computer programming, gaming/mobile development, and artificial intelligence/ robotics.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 to 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	

Additional Notes	**Note**: This course qualifies for funding at the 8th grade level. When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma	
ADDITIONAL COURSE INFO		
Funding	Introductory	Available for 8th grade
Bulletin 400	● Business Education 7- 12 ● Industrial Arts, Math or Science with Professional Development or additional training in Computer Science	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12 ● Occupational Specialist in "Computer Science" related course approved for a CTE pathway ● Industrial Technology/Education, Math or Science with Professional Development or additional training in Computer Science	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development ● Workplace Specialist in "Computer Science"related course approved for a CTE pathway ● Technology Education, Math, or Science with Professional Development or additional training in Computer Science	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5- 12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist in related "Computer Science" course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
4803.D1.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
4803.D1.2	Explain the benefits and responsibilities of being a member of a CTSO.
4803.D1.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
4803.D1.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Career Exploration***
4803.D2.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
4803.D2.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster.
4803.D2.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
4803.D2.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society.
4803.D2.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest.
4803.D2.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
4803.D2.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster.
4803.D2.8	Explore the consequences resulting from issues involving ethics around security, privacy, copyright, fair use, intellectual property, social media and licensing.
4803.D2.9	Describe ethical and legal practices safeguarding the confidentiality of business-and personal-related information.
Domain	***Computer Science***
4803.D3.1	Describe how computer programs and apps can be used to solve various problems (e.g., desktop, mobile, enterprise).
4803.D3.2	Define algorithm (a set of clearly defined logical steps to solve a problem).
4803.D3.3	Demonstrate an understanding of algorithms and their practical applications
4803.D3.4	Create, evaluate, and adjust algorithms to solve a variety of problems.
4803.D3.5	Use an iterative problem-solving process to design and refine solutions to a variety of problems • Define the problem including a variety of considerations (e.g., users, environment, demographics, societal trends, etc.) • Design a solution

	• Prepare, test, and refine the solution • Reflect on results
Domain	***Cybersecurity***
4803.D4.1	Explain the importance of Acceptable Use Policies and data and physical security.
4803.D4.2	Identify computing threats (e.g., spyware, adware, malware, viruses, ransomware, phishing, hacking, software piracy, identity theft, etc.) and their potential impacts on society.
4803.D4.3	Evaluate methods of keeping information secret from those whom the information should be kept secret.
4803.D4.4	Evaluate methods of protecting information and information systems from disruption and destruction.
4803.D4.5	Explain the importance of encapsulating resources, i.e., creating well-defined interfaces around resources to set rules for how the resources should interact.
4803.D4.6	Analyze how the connected nature of the Internet allows an adversary to reach a large number of devices.
4803.D4.7	Identify and predict the outcomes of security vulnerabilities at the physical/link layer, the network layer, the transport layer, and the application layer.
4803.D4.8	Identify and distinguish between the purposes of network security devices and technologies.
4803.D4.9	Compare and contrast data protection legislation, policies, and procedures that have been or are being introduced all over the world to protect personal data.
4803.D4.10	Students will identify how hardware and software work together in complex ways to achieve an overall objective.
Domain	***Operations and Support***
4803.D5.1	Demonstrate proficiency and skills associated with the use of technologies that are common to a specific occupation (e.g., keying speed).
4803.D5.2	Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.
4803.D5.3	Evaluate various solutions to common hardware and software problems.
4803.D5.4	Describe how software and hardware interact.
4803.D5.5	Compare and contrast characteristics of a variety of file formats (e.g., software compatibility, file size, compresses/uncompressed files).
Domain	***Networking***
4803.D6.1	Define key computing terms (e.g., hardware, software, data, etc.).
4803.D6.2	Identify and define the key functional components (input devices, output devices, processor, operating system, software applications, memory, storage, etc.).
4803.D6.3	Define the terms and units that are used to describe major hardware components (RAM, ROM, Peta-, Tera-, Giga-, Mega- Kilo-, Hz, Bit, Byte, Binary, etc.).
Domain	***Software Development***
4803.D7.1	Express the design of a program using representations such as flowcharts and pseudocode.
4803.D7.2	Analyze and explain how a particular program functions.
4803.D7.3	Solve problems of increasing complexity using visual block-based programming individually

	and collaboratively.
4803.D7.4	Write code that uses variables, events, functions, operators (i.e. arithmetic, relational, logical), conditional control structures (e.g., if, if-else) and repetition/iteration control structures (e.g., while, for).
4803.D7.5	Differentiate between text and numerical data.
4803.D7.6	Edit, compile/run, test, and debug a program.

Computer Science: Special Topics	
Career Cluster	Digital Technology
Program of Study	
NLPS Sequence	
Course Code	5252
Course Description	*Computer Science III: Special Topics is an extended experience designed to address the advancement and specialization of computer science careers allowing schools to provide a specialized course for a specific computer science workforce need in the school's region. It prepares students with the knowledge, skills and attitudes essential for working in the field of computer science. Course standards and curriculum must be tailored to the specific computer science specialization. This course must prepare students for advancement in this career field and should provide students with opportunities for certification or dual credit.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding. Formerly Computer Science III: Special Topics
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Must have an approved Non-Standard Course Waiver to use this course. Licensing is determined during the waiver process.
Rules 46-47	● Must have an approved Non-Standard Course Waiver to use this course. Licensing is determined during the waiver process.
Rules 2002	● Must have an approved Non-Standard Course Waiver to use this course. Licensing is determined during the waiver process.
REPA/REPA 3	● Must have an approved Non-Standard Course Waiver to use this course. Licensing is

	determined during the waiver process.
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	

Advanced Career & Technical Education, College Credit: Digital Technology	
Career Cluster	Digital Technology
Program of Study	
NLPS Sequence	
Course Code	6022
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited postsecondary institution through an adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint program of study involving a postsecondary partnership.*
Prerequisite(s)/ Corequisite(s)	None Recommended Prerequisites: CTE courses that would help prepare the student for success in this area.
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X (PCL/CTE)

Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.	
ADDITIONAL COURSE INFO		
Funding	Pilot	
Bulletin 400	● Industrial Arts 7-12, K12 ● Appropriate Vocational License	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Appropriate Vocational license ● Occupational Specialist in related course approved for a CTE pathway	
Rules 2002	● Technology Education with high school setting ● Appropriate CTE License with high school setting ● Workplace Specialist in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education 5-12 ● Appropriate CTE License 5-12 ● Workplace Specialist in related course approved for a CTE Pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain		

Advanced Digital Skills Capstone		
Career Cluster	Digital Technology	
Program of Study		
NLPS Sequence		
Course Code	7396	
Course Description	*Digital Skills Capstone introduces digital skills and tools critical to manage information. The skills learned in this class will help individuals communicate and collaborate, develop and share digital content, and problem solve. This course will focus on applying advanced digital skills to a particular industry or occupation. The focus will be on advanced IT skills in programming, web, and app development, networking and sharing information, data science, and digital business analysis.*	
Prerequisite(s)/ Corequisite(s)	Any CTE Concentrator Sequence except the Information Technology or Computer Science pathways. Recommended Prerequisites: Earn CTE Concentrator Status in any CTE program or program of study	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Vale	Level II
Bulletin 400	● Business Education with Vocational Business Endorsement 7-12	
Rules 46-47	● Business Education with Vocational Business Endorsement 9-12 ● Occupational Specialist: Business IT: Interactive Media 9-12	
Rules 2002	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Interactive Media ● CTE: Trade & Industrial: 3D Computer Animation & Visualization ● Business with high school setting ● Workplace Specialist: 3D Computer Animation & Visualization ● Workplace Specialist: Interactive Media ● Workplace Specialist: Graphic Imaging Technology ● CTE: Trade & Industrial Photography 5-12 ● Workplace Specialist: Commercial Photography 9-12	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12	

	● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Interactive Media 9-12 ● Workplace Specialist: Graphic Imaging Technology 9-12 ● Workplace Specialist: Computer Illustration & Graphics 9-12 ● Workplace Specialist: Graphic Design and Layout 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	

Digital Technology Computer Science							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7183	Principles of Computing	7351	Topics in Computer Science	7352	Computer Science	7353	Computer Science Capstone

Principles of Computing		
Career Cluster	Digital Technology	
Program of Study	Computer Science, Cybersecurity, IT Operations, Networking, Software Development, Informatics	
NLPS Sequence	A	
Course Code	7183	
Course Description	*Principles of Computing provides students the opportunity to explore how computers can be used in a wide variety of settings. The course will begin by exploring trends of computing and the necessary skills to implement information systems. Topics include computing, operating systems, database technology, security, cloud implementations and other concepts associated with applying the principles of good information management to the organization. Students will also have the opportunity to utilize basic programming skills to develop scripts designed to solve problems. Students will learn about algorithms, logic development and flowcharting.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Industrial Arts, Math or Science with Professional Development or additional training in Computer Science	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12 ● Occupational Specialist in “Computer Science” related course approved for a CTE pathway	

	● Industrial Technology/Education, Math or Science with Professional Development or additional training in Computer Science
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development ● Workplace Specialist in "Computer Science" related course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist in related "Computer Science" course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SDEV 120: Computing Logic; INFM 109: Informatics Fundamentals
VU Course Alignment	COMP 177: Introduction to Programming Logic- Design and Development
Four Yr. Course Alignment	IUB - CSCI-C 106: Introduction to Computers and Their Uses PFW - CS 11200: Computer Science for Everyone PNW - ITS 10000: Information Technology Fundamentals; ITS 14000: Intro to Computer Algorithms and Logic
Postsecondary Credential	IUB – B.S. Informatics (11.0104) PFW – A.S. Information Systems (11.0101) PNW - B.S. Cybersecurity (11.1003/11.0103) VU - CG Information Technology (11.0103)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Computing Basics***
7183.D1.1	Discuss different aspects of the nature of information from a human and mechanical standpoint.
7183.D1.2	Demonstrate awareness of the history of computing.
7183.D1.3	Demonstrate a working knowledge of computer hardware basics and the ability to use the available productivity software.

7183.D1.4	Demonstrate a knowledge of Software, different categories, and how it is developed.
7183.D1.5	Understand cloud computing, virtualization, and the Internet
7183.D1.6	Discuss the basic use of data visualization, statistics, and reporting within an organization.
7183.D1.7	Discuss the concepts of logical and physical data storage as they apply locally and, in the cloud, including the use of database structures and storage area network technology.
7183.D1.8	Explain the fundamental concepts of an information system, including the life cycle, components, and flow of information within an organization.
7183.D1.9	Summarize how informatics can support the organization, including general management, operations, human resources, and financial management.
7183.D1.10	Discuss the importance of security within informatics, including its application in various aspects of the computing disciplines.
7183.D1.11	Discuss the importance of ethics, bias, and effective dissemination of technological knowledge.
Domain	***Programming Basics***
7183.D2.1	Identify the standard documentation tools of displaying algorithms such as pseudocode, flowchart symbols and UML.
7183.D2.2	Apply basic logical structures, file handling, matrices, and arrays to program algorithms.
7183.D2.3	Apply truth tables, Boolean logic, control structures, relational and logical operators to program algorithms
7183.D2.4	Use set theory and logic gate theory to develop program algorithms.
7183.D2.5	Document and express code and algorithms in an easily understandable manner using tools such as data flow diagrams, flowcharts, use case diagrams, activity diagrams, and state tables.
7183.D2.6	Develop a simple program and/or script using a compiled, object-oriented scripting language like Python.
7183.D2.7	Compare key techniques to visually represent data such as graphs, charts and tables.
7183.D2.8	Create applications that interact with users, demonstrating proper formatting of data.
7183.D2.9	Apply base numbering systems techniques to convert numeric data to any base numbering format, including binary, decimal, and hexadecimal.
7183.D2.10	Identify the uses of various programming and scripting languages in computer systems.
7183.D2.11	Compare and Contrast software development methodologies as it pertains to software development and problem solving.
7183.D2.12	Discuss the concepts and justifications for using secure design techniques.
7183.D2.13	Demonstrate secure code by means of data validation.
7183.D2.14	Describe the different methods for encoding data such as BCD, 1's complement, 2's complement, ASCII, and Unicode.
7183.D2.15	Describe the components of a computer architecture.
7183.D2.16	Understand and implement the fundamentals of an Integrated Development Environment (IDE).
7183.D2.17	Successfully identify and debug errors in applications produced by themselves or others.
7183.D2.18	Use puzzles and games to enhance problem-solving skills.
7183.D2.19	Apply critical thinking and problem-solving methodologies.
7183.D2.20	Show the ability to delegate tasks into user defined procedures for the purpose of efficiency.
Domain	***Career Navigation***
7183.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7183.D3.2	Understand the specialized skills needed for different career opportunities related to the

	program of study.
7183.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7183.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7183.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7183.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7183.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7183.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7183.D5.1	Demonstrate computer literacy skills and basic computer functions.
7183.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7183.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7183.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Topics in Computer Science	
Career Cluster	Digital Technology
Program of Study	Computer Science
NLPS Sequence	B
Course Code	7351
Course Description	*Topics in Computer Science is designed for students to investigate emerging disciplines within the field of computer science. Students will use foundational knowledge from 7183 Principles of Computing to study the areas of data science, artificial intelligence, app/game development, and security. Students will utilize knowledge related to these areas and programming skills to develop solutions to authentic problems.*
Prerequisite(s)/ Corequisite(s)	Principles of Computing
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma
Dual Credit Status	X (PCL/CTE)

Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7- 12 ● Industrial Arts, Math or Science with Professional Development or additional training in Computer Science	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9- 12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12 ● Occupational Specialist in "Computer Science" related course approved for a CTE pathway ● Industrial Technology/Education, Math or Science with Professional Development or additional training in Computer Science	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development ● Workplace Specialist in "Computer Science" related course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5- 12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist in related "Computer Science" course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment	IUB - INFO-I230: Analytical Foundations of Security	
Postsecondary Credential	IUB – B.S. Informatics (11.0104)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		

Competency #	Competency
Domain	***Data Science***
7351.D1.1	Define and discuss different examples of level-appropriate quantitative and qualitative data.
7351.D1.2	Evaluate the tradeoffs in how data elements are organized and where data is stored.
7351.D1.3	Analyze and interpret data by identifying patterns and consider limitations of data analysis (e.g., measurement error, sample selection).
7351.D1.4	Design and implement a plan using data collection tools and techniques to collect appropriate data to answer a relevant research question.
7351.D1.5	Create interactive data visualizations using software tools to help others better understand real-world phenomena.
Domain	***Artificial Intelligence***
7351.D2.1	Compare and contrast concepts and uses of machine learning, deep learning, general artificial intelligence, and narrow artificial intelligence.
7351.D2.2	Investigate imbalances in training data in terms of gender, age, ethnicity, or other demographic variables that could result in a biased model, by using a data visualization tool.
7351.D2.3	Research and describe the risks and risk mitigation strategies associated with the implementation of artificial intelligence and machine learning in the real world (e.g., biased decision making, lethal autonomous weapons, social media echo chambers, surveillance).
7351.D2.4	Evaluate a dataset used to train a real AI system by considering the size of the dataset, the way that the data were acquired and labeled, the storage required, and the estimated time to produce the dataset.
7351.D2.5	Select the appropriate type of machine learning algorithm (supervised, unsupervised, or reinforcement learning) to solve a reasoning problem.
7351.D2.6	Use a learning algorithm to train a model on data collected to answer a relevant research question, then evaluate the results.
Domain	***App/Game Development***
7351.D3.1	Analyze game elements of analog games (e.g., board, card, dice) and how those elements can be represented as algorithms for digital games.
7351.D3.2	Research and discuss best practices of user experience design for building video games and apps.
7351.D3.3	Document design decisions using text, graphics, presentations, and/or demonstrations in the development of games and applications.
7351.D3.4	Using the software application life cycle and prototype development model, develop a new application or game working in team roles using collaborative tools.
7351.D3.5	Develop and use a series of test cases to verify that a program performs according to its design specifications.
Domain	***Security (Cybersecurity)***
7351.D4.1	Examine the positive and negative impacts of a person/organization's digital footprint.
7351.D4.2	Analyze the motives of threat actors.
7351.D4.3	Discuss the role that cyber ethics plays in current society.
7351.D4.4	Research and describe common attacks on hardware, software, and networks and identify methods of mitigating risk associated with each.
7351.D4.5	Evaluate authentication and authorization methods and the risks associated with failure.
7351.D4.6	Analyze the vulnerabilities of Internet of Things devices.

7351.D4.7	Utilizing cybersecurity best practices and the software development life cycle, make appropriate updates to a game or application design to protect it from vulnerabilities.

Computer Science		
Career Cluster	Digital Technology	
Program of Study	Computer Science	
NLPS Sequence	C	
Course Code	7352	
Course Description	*Computer Science introduces the fundamental concepts of procedural programming. Topics include data types, control structures, functions, arrays, files, and the mechanics of running, testing, and debugging. The course also offers an introduction to the historical and social context of computing and an overview of computer science as a discipline.*	
Prerequisite(s)/ Corequisite(s)	Principles of Computing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	The AP Computer Science A curriculum may be used to complete the competencies required for this course.	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7- 12 ● Industrial Arts, Math or Science with Professional Development or additional training in Computer Science	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9- 12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12 ● Industrial Technology/Education, Math or Science with Professional Development or additional training in Computer Science	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development ● Technology Education, Math or Science with Professional Development or additional training in Computer Science	
REPA/REPA 3	● Computer Education 5-12, P-12	

	● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5- 12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	CSCI 101: Computer Science I
VU Course Alignment	
Four Yr. Course Alignment	IUB – CSCI-C200: Introducation to Computers and Programming PFW – CS 16000: Introduction to Computer Science I
Postsecondary Credential	IUB – B.S. Informatics (11.0104) PFW – Certificate Computer Information Systems
Liberal Arts/Sciences Requirements	MATH 211: Calculus I
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Advanced Programming***
7352.D1.1	Discuss software development methodology that include fundamental design concepts and principles, Structured and Iterative design, UML (Unified Modeling Language).
7352.D1.2	Demonstrate fundamental programming constructs such as understanding of language syntax, semantics and style standards including documentation and commenting, using IDEs to create, execute, test, and debug programs utilizing standard software development design and methodologies.
7352.D1.3	Analyze and explain the behavior of simple programs utilizing variables, expressions, assignments, I/O, control structures, functions, parameter passing, preconditions, postconditions, and invariants.
7352.D1.4	Utilize fundamental data types including Primitive types (Integers, Real Numbers, Booleans, and Characters), Pointers, Arrays, Records/Structures, Strings, Enumerations
7352.D1.5	Use the techniques of decomposition to modularize a program.
7352.D1.6	Apply a variety of strategies to the testing and debugging of simple programs including: • Conduct code reviews (focused on common coding errors and the extent to which the code meets documentation and programming style standards) on program components. • Differentiate between program validation and verification. • Ensure programs use defensive programming techniques, including input validation, type checking, and protection against buffer overflow.

	• Implement refactoring within given program components.
Domain	***Computer Design and Function***
7352.D2.1	Explain the role of algorithms in problem-solving including: • Analyze and compare the best, average, and worst-case behaviors and performance of an algorithm for given problems with various input sizes • Implement a basic numerical algorithm and apply it to a given problem. • Discuss the halting problem and why it has no algorithmic solution. • Investigate factors other than computational efficiency that influence the choice of algorithms.
7352.D2.2	Analyze machine level representation of data including: • Bits, bytes, and words • Numeric data representation (Binary, Hexadecimal, BCD, 1's Complement, 2's Complement, and Floating-Point format) • Non-numeric data (Characters, Images, Sounds, Video) • Illustrate color models and their use in computer graphics. • Conversion of numerical data from one format to another • Effect of fixed-length number representations on accuracy and precision
7352.D2.3	Describe, compare, and contrast the components of Computer Architecture which include all portions of the Von Neumann machine as well as assembly/machine language. Explore the impact of memory latency on execution time (Von Neumann Bottleneck).
7352.D2.4	Examine major objectives, functions, features, and concepts of modern operating systems. • Discuss the role, purpose of operating systems • Compare prevailing types of operating systems. • Discuss potential threats to operating systems and appropriate features used to provide protection and security. • Diagram the interaction of an Application Programming Interface (API) with an operating system. • Illustrate how applications use computing resources managed by the operating system and explain the need for concurrency and common methods to implement concurrency. • Illustrate the principles of memory management including virtual memory, paging, thrashing, and partitioning. • Diagram the physical hardware devices and the virtual devices maintained by an operating system.
7352.D2.5	Investigate principles of secure design. • Analyze the tradeoffs associated with designing security into a product. • Implement input validation in applications • Discuss the security implications of relying on open design vs the secrecy of design. • Explain the tradeoffs of developing a program in a type-safe language. • Investigate potential errors detected from both strong-type and weak-type languages. • Investigate potential vulnerabilities in provided programming code. • Investigate common coding errors that introduce security vulnerabilities, such as buffer overflows, integer errors, and memory leaks.
7352.D2.6	Assess human-computer interaction and design issues that analyze the importance of human-

	centered software and then implement a simple usability test for an existing software application.

Computer Science Capstone		
Career Cluster	Digital Technology	
Program of Study	Computer Science	
NLPS Sequence	D	
Course Code	7353	
Course Description	*Computer Science Capstone provides a working understanding of the fundamentals of procedural and object-oriented program development using structured, modular concepts and modern object-oriented programming languages. Reviews control structures, functions, data types, variables, arrays, and data file access methods. The course is a second level computer science course introducing object oriented computer programming, using a language such as Java or C++. Object-oriented concepts studied include classes, objects, inheritance, polymorphism, operator overloading, exception handling, recursion, abstract data types, streams and file I/O. Students will explore programming concepts such as software reuse, data abstraction and event-driven programming.*	
Prerequisite(s)/ Corequisite(s)	Principles of Computing; Topics in Computer Science; Computer Science	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Business Education 7- 12 ● Industrial Arts, Math or Science with Professional Development or additional training in Computer Science	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12 ● Industrial Technology/Education, Math or Science with Professional Development or additional training in Computer Science	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development ● Technology Education, Math or Science with Professional Development or additional	

	training in Computer Science
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5- 12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	CSCI 201: Computer Science II*, SDEV 200: Software Development Using Java*, SDEV 220: Software Development Using Python*, SDEV 240: Software Development Using C#*
VU Course Alignment	
Four Yr. Course Alignment	PFW – CS 16100: Introduction to Computer Science II
Postsecondary Credential	PFW – Certificate Computer Information Systems
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Procedural Concepts***
7353.D1.1	Demonstrate the basic procedural concepts of computer programming through development of programs that utilize: • Arithmetic operators expressions and statements • Reference data types • Input/output • Primitive and abstract data types • Selection and repetition statements • Investigate potential vulnerabilities in provided programming code. • User defined methods and functions • Collections including arrays, lists, vectors, stacks, and queues • Streams to create and access data files • Common/standard language libraries
Domain	***Object-oriented Concepts***
7353.D2.1	Demonstrate the basic object-oriented concepts of computer programming
7353.D2.2	Compare and contrast functional and object-oriented programming paradigms

7353.D2.3	Implement OOP constructs, including encapsulation, abstraction, inheritance, and polymorphism
7353.D2.4	Utilize immutable and mutable variables in class objects
7353.D2.5	Use access and visibility modifiers to secure class data and methods
7353.D2.6	Diagram control flow in a program using dynamic dispatch
7353.D2.7	Design and implement a simple class hierarchy using super classes, subclasses, and abstract classes
7353.D2.8	Overload functions and operators
7353.D2.9	Design and implement generic classes with templates
7353.D2.10	Identify the data components and behaviors of multiple abstract data types
7353.D2.11	Apply a variety of strategies to the testing and debugging of programs
Domain	***Graphical User Interfaces/ Event Driven Programs***
7353.D3.1	Develop Graphical User Interfaces/Event Driven Programs
7353.D3.2	Explain basic principles of computer graphics including 2D and 3D objects, transformations, clipping, windowing, rendering, lighting, and ray tracing
7353.D3.3	Illustrate color models and their use in computer graphics
7353.D3.4	Write a simple application that uses a modern graphical user interface
7353.D3.5	Create an interactive program using an event-driven style
7353.D3.6	Discuss the usage of information hiding through steganography in images, messages, videos, or other media files
Domain	***Software Engineering, Maintenance, and Reuse***
7353.D4.1	Discuss software engineering, software maintenance and software reuse
7353.D4.2	Illustrate the concepts of modeling and abstraction with respect to problem solving
7353.D4.3	Diagram the phases of the secure software development lifecycle (SecSDLC)
7353.D4.4	Describe the concept of finite state machines
7353.D4.5	Describe security as a continuous process of tradeoffs, balancing between protection mechanisms and availability
7353.D4.6	Illustrate the security implications of relying on open design vs the secrecy of design
7353.D4.7	Apply consistent documentation and program style standards
Domain	***Networking and Data Communication***
7353.D5.1	Demonstrate basic concepts of networking and data communications
7353.D5.2	Diagram the basic structure of the Internet
7353.D5.3	Diagram the layers of the OSI model, including associated protocols (TCP/UDP, Socket APIs, and Application Layer Protocols)
7353.D5.4	Categorize the principles used for naming schemes and resource location. NC
7353.D5.5	Implement a simple distributed network application
7353.D5.6	Describe security concerns in designing applications for use over wired and wireless networks
Domain	***Secure Programming and Design***

7353.D6.1	Demonstrate the principles of secure programming and design
7353.D6.2	Investigate potential vulnerabilities in provided programming code
7353.D6.3	Create programs which use defensive programming techniques, including input validation, type checking, exception handling and protection against buffer overflow
7353.D6.4	Analyze the interaction between a security mechanism and its usability
7353.D6.5	Investigate potential vulnerabilities in provided programming code
7353.D6.6	Investigate common coding errors that introduce security vulnerabilities, including buffer overflows, integer errors, and memory leaks
7353.D6.7	Discuss potential errors and security implications from both strong-type and weak-type languages
7353.D6.8	Evaluate the risks in using third-party applications, software tools, and libraries
7353.D6.9	Carry out a code review on a program component using a provided security checklist
7353.D6.10	Describe potential security vulnerabilities in event-driven GUI applications

Digital Technology Cybersecurity (VU)							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7183	Principles of Computing	7179	Cybersecurity Fundamentals	7178	Advanced Cybersecurity	7243	Cybersecurity Capstone

Principles of Computing		
Career Cluster	Digital Technology	
Program of Study	Computer Science, Cybersecurity, IT Operations, Networking, Software Development, Informatics	
NLPS Sequence	A	
Course Code	7183	
Course Description	*Principles of Computing provides students the opportunity to explore how computers can be used in a wide variety of settings. The course will begin by exploring trends of computing and the necessary skills to implement information systems. Topics include operating systems, database technology, cybersecurity, cloud implementations and other concepts associated with applying the principles of good information management to the organization. Students will also have the opportunity to utilize basic programming skills to develop scripts designed to solve problems. Students will learn about algorithms, logic development and flowcharting.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Industrial Arts, Math or Science with Professional Development or additional training in Computer Science	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12 ● Occupational Specialist in “Computer Science” related course approved for a CTE pathway ● Industrial Technology/Education, Math or Science with Professional Development or	

	additional training in Computer Science
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development ● Workplace Specialist in "Computer Science" related course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist in related "Computer Science" course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SDEV 120: Computing Logic; INFM 109: Informatics Fundamentals
VU Course Alignment	COMP 177: Introduction to Programming Logic - Design and Development
Four Yr. Course Alignment	IUB - CSCI-C 106: Introduction to Computers and Their Uses PFW - CS 11200: Computer Science for Everyone PNW - ITS 10000: Information Technology Fundamentals; ITS 14000: Intro to Computer Algorithms and Logic
Postsecondary Credential	VU - CG Information Technology (11.0103) IUB – B.S. Informatics (11.0104) PFW – A.S. Information Systems (11.0101) PNW – B.S. Cybersecurity
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Computing Basics***
7183.D1.1	Discuss different aspects of the nature of information from a human and mechanical standpoint.
7183.D1.2	Demonstrate awareness of the history of computing.
7183.D1.3	Demonstrate a working knowledge of computer hardware basics and the ability to use the available productivity software.
7183.D1.4	Demonstrate a knowledge of Software, different categories, and how it is developed.

7183.D1.5	Understand cloud computing, virtualization, and the Internet
7183.D1.6	Discuss the basic use of data visualization, statistics, and reporting within an organization.
7183.D1.7	Discuss the concepts of logical and physical data storage as they apply locally and in the cloud, including the use of database structures and storage area network technology.
7183.D1.8	Explain the fundamental concepts of an information system, including the life cycle, components, and flow of information within an organization.
7183.D1.9	Summarize how informatics can support the organization, including general management, operations, human resources, and financial management.
7183.D1.10	Discuss the importance of security within informatics, including its application in various aspects of the computing disciplines.
7183.D1.11	Discuss the importance of ethics, bias, and effective dissemination of technological knowledge.
Domain	***Programming Basics***
7183.D2.1	Identify the standard documentation tools of displaying algorithms such as pseudocode, flowchart symbols and UML.
7183.D2.2	Apply basic logical structures, file handling, matrices, and arrays to program algorithms.
7183.D2.3	Apply truth tables, Boolean logic, control structures, relational and logical operators to program algorithms
7183.D2.4	Use set theory and logic gate theory to develop program algorithms.
7183.D2.5	Document and express code and algorithms in an easily understandable manner using tools such as data flow diagrams, flowcharts, use case diagrams, activity diagrams, and state tables.
7183.D2.6	Develop a simple program and/or script using a compiled, object-oriented scripting language like Python.
7183.D2.7	Compare key techniques to visually represent data such as graphs, charts, and tables.
7183.D2.8	Create applications that interact with users, demonstrating proper formatting of data.
7183.D2.9	Apply base numbering systems techniques to convert numeric data to any base numbering format, including binary, decimal, and hexadecimal.
7183.D2.10	Identify the uses of various programming and scripting languages in computer systems.
7183.D2.11	Compare and Contrast software development methodologies as it pertains to software development and problem solving.
7183.D2.12	Discuss the concepts and justifications for using secure design techniques.
7183.D2.13	Demonstrate secure code by means of data validation.
7183.D2.14	Describe the different methods for encoding data such as BCD, 1's complement, 2's complement, ASCII, and Unicode.
7183.D2.15	Describe the components of a computer architecture.
7183.D2.16	Understand and implement the fundamentals of an Integrated Development Environment (IDE).
7183.D2.17	Successfully identify and debug errors in applications produced by themselves or others.
7183.D2.18	Use puzzles and games to enhance problem-solving skills.
7183.D2.19	Apply critical thinking and problem-solving methodologies.
7183.D2.20	Show the ability to delegate tasks into user defined procedures for the purpose of efficiency.
Domain	***Career Navigation***
7183.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7183.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.

7183.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7183.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7183.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7183.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7183.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7183.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7183.D5.1	Demonstrate computer literacy skills and basic computer functions.
7183.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7183.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7183.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Cybersecurity Fundamentals		
Career Cluster	Digital Technology	
Program of Study	Cybersecurity	
NLPS Sequence	B	
Course Code	7179	
Course Description	*This course introduces fundamental networking protocols and their hierarchical relationship in the context of conceptual Information Communication Technology (ICT) frameworks. Students will learn how networked hosts and applications communicate across networks. Emphasis is placed on security throughout the entire SDLC (Systems Development Life Cycle).*	
Prerequisite(s)/ Corequisite(s)	Principles of Computing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a science requirement for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I

Bulletin 400	● Business Education 7-12
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Information Support & Services
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Cybersecurity 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	VU-EC - CNET 146: Introduction to Network Operations and Security ; CNET 246: Fundamentals in Network Operations and Security
Four Yr. Course Alignment	
Postsecondary Credential	VU-EC - CG Cyber Security and Network Operations (11.1003)
Liberal Arts/Sciences Requirements	VU - ENGL 101: English Composition I, MATH 103: Quantitative Reasoning, PSYC 141: Applied Psychology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Intro to Network Operations and Security***
7179.D1.1	Define Information Communication Technology (ICT) and describe the concepts behind it.
7179.D1.2	Identify and explain various network topologies.
7179.D1.3	Apply the foundational building blocks of a network infrastructure.
7179.D1.4	Connect basic network infrastructure devices to create a limited functioning local network.
7179.D1.5	Understand and identify organizational digital assets.
7179.D1.6	Describe how to protect digital assets through secure network infrastructure configurations.
7179.D1.7	Design an organizational network infrastructure.
Domain	
7179.D2.1	Know the need for network security and security policies.

7179.D2.2	Explain the various types of network security technology & protocols available & the advantages/differences of each.
7179.D2.3	Demonstrate a knowledge & understanding of different types of security components such as routers, firewalls, & protocols & how they can be
7179.D2.4	implemented onto various network topologies.
7179.D2.5	Differentiate specific security protocols and their implementations.
7179.D2.6	Create a firewall & security policy that follows a strict set of guidelines for a network that the student will create.

Advanced Cybersecurity		
Career Cluster	Digital Technology	
Program of Study	Cybersecurity	
NLPS Sequence	C	
Course Code	7178	
Course Description	*Students will acquire the fundamentals of information and data security and understand the vulnerability most organizations have in their security systems with an emphasis on firewalls, security plans and Virtual Private Networks (VPNs). Discussions will include data security methods, authentication, network attacks, malicious code and viruses, wireless security, e-mail and web security and disaster recovery. This course will also focus on the managerial aspects of information security and assurance. Topics covered include access control models, information security governance, and information security program assessment and metrics. Coverage on the foundational and technical components of information security is included to reinforce key concepts, such as security planning and contingencies, security policies, security management models and practices and ethics.*	
Prerequisite(s)/ Corequisite(s)	Principles of Computing; Cybersecurity Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting	

	● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Information Support & Services
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Cybersecurity 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	CNET 151: Information and Data Security I VU-EC - CNET 251: Information and Data Security II
Four Yr. Course Alignment	
Postsecondary Credential	VU/EC - CG Cyber Security and Network Operations (11.1003)
Liberal Arts/Sciences Requirements	VU - ENGL 101: English Composition I, MATH 103: Quantitative Reasoning, PSYC 141: Applied Psychology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Basic Cyber Crime and Computer Forensics***
7178.D1.1	Identification of the components & steps of computer and cyber investigations.
7178.D1.2	Demonstrate an understanding of legislation, (both Federal and State) and how they relate to cybercrime.
7178.D1.3	Gain an understanding of how to investigate cybercrime from a technical perspective.
7178.D1.4	Develop a comprehensive list of types of cybercrime and threats that exist in today's connected world.

Cybersecurity Capstone	
Career Cluster	Digital Technology
Program of Study	Cybersecurity
NLPS Sequence	D
Course Code	7243
Course	*The Cybersecurity Capstone is designed to increase a student's ability to investigate advanced*

Description	*topics with a primary focus on computer forensics, cyber law, cybercrimes, and cyber forensics. Using Federal, State, and existing case laws, students will gain in-depth experience investigating and gathering evidence to prepare for a presentation in a court of law. This course will emphasize the need for structured investigation techniques and proper protocol for maintaining a chain of evidence. Students will learn to follow proper investigative procedures while using a variety of forensic software tools and techniques.*	
Prerequisite(s)/ Corequisite(s)	Principles of Computing; Cybersecurity Fundamentals; Advanced Cybersecurity	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Information Support & Services	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Cybersecurity 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment	VU -EC - CNET 155: Basic Cyber Crime and Computer Forensics ; CNET 255: Advanced Researches in Cyber Crime and Forensics ; CNET 236: Operating Systems I	
Four Yr. Course Alignment		
Postsecondary Credential	VU/EC - CG Cyber Security and Network Operations (11.1003)	
Liberal Arts/Sciences	VU - ENGL 101: English Composition I, MATH 103: Quantitative Reasoning, PSYC 141: Applied Psychology	

Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Operating Systems I***
7243.D1.1	Know & understand the proper techniques of installation, configuration, error diagnosis, troubleshooting, & repairing of various operating systems.
7243.D1.2	Explain the requirements associated with the installations of each operating system.
7243.D1.3	Demonstrate the ability to install, configure, & repair an operating system created during class.
7243.D1.4	Analyze the skills required to be an operating system administrator.
Domain	***Fundamentals in Network Operations and Security***
7243.D2.1	Identify trends in Information Communication Technology (ICT) for networking protocols.
7243.D2.2	Apply the foundational concepts of how data travels on a network infrastructure.
7243.D2.3	Securely configure access rights, and traffic on a network infrastructure.
7243.D2.4	Protect digital assets through network infrastructure configurations and monitoring.
7243.D2.5	Design and implement an organizational network infrastructure.
Domain	***Information and Data Security II***
7243.D3.1	Describe the key components of a security metrics program.
7243.D3.2	List the fundamental elements of key information security management practices.
7243.D3.3	Define various access control approaches, including authentication, authorization, and biometric access controls.
7243.D3.4	Explain popular approaches used in industry to manage risk
Domain	***Advanced Research in Cyber Crime and Forensics***
7243.D4.1	Access and use provided forensic software to complete investigative research.
7243.D4.2	Complete Case Studies that require the use of inference and knowledge of cyber laws at the state and federal level.
7243.D4.3	Create supporting documents that could be used to support cybercrime cases in litigation.
7243.D4.4	Understand current threats, vulnerabilities, and mitigation strategies for cybercrime.

Digital Technology Cybersecurity and Information Assurance (ITCC)							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7183	Principles of Computing	7180	Information Technology Fundamentals	7181	Networking and Cybersecurity Operations	7249	Cybersecurity Operations Capstone

Principles of Computing		
Career Cluster	Digital Technology	
Program of Study	Computer Science, Cybersecurity, IT Operations, Networking, Software Development, Informatics	
NLPS Sequence	A	
Course Code	7183	
Course Description	*Principles of Computing provides students the opportunity to explore how computers can be used in a wide variety of settings. The course will begin by exploring trends of computing and the necessary skills to implement information systems. Topics include operating systems, database technology, cybersecurity, cloud implementations and other concepts associated with applying the principles of good information management to the organization. Students will also have the opportunity to utilize basic programming skills to develop scripts designed to solve problems. Students will learn about algorithms, logic development and flowcharting.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Industrial Arts, Math or Science with Professional Development or additional training in Computer Science	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	

	● Occupational Specialist in "Computer Science" related course approved for a CTE pathway ● Industrial Technology/Education, Math or Science with Professional Development or additional training in Computer Science
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development ● Workplace Specialist in "Computer Science" related course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist in related "Computer Science" course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SDEV 120: Computing Logic; INFM 109: Informatics Fundamentals
VU Course Alignment	COMP 177: Introduction to Programming Logic- Design and Development
Four Yr. Course Alignment	IUB - CSCI-C 106: Introduction to Computers and Their Uses PFW - CS 11200: Computer Science for Everyone PNW - ITS 10000: Information Technology Fundamentals; ITS 14000: Intro to Computer Algorithms and Logic
Postsecondary Credential	VU - CG Information Technology (11.0103) IUB – B.S. Informatics (11.0104) PFW – A.S. Information Systems (11.0101) PNW – B.S. in Cybersecurity (11.1003/11.0103)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Computing Basics***
7183.D1.1	Discuss different aspects of the nature of information from a human and mechanical standpoint.
7183.D1.2	Demonstrate awareness of the history of computing.
7183.D1.3	Demonstrate a working knowledge of computer hardware basics and the ability to use the

	available productivity software.
7183.D1.4	Demonstrate a knowledge of Software, different categories, and how it is developed.
7183.D1.5	Understand cloud computing, virtualization, and the Internet
7183.D1.6	Discuss the basic use of data visualization, statistics, and reporting within an organization.
7183.D1.7	Discuss the concepts of logical and physical data storage as they apply locally and, in the cloud, including the use of database structures and storage area network technology.
7183.D1.8	Explain the fundamental concepts of an information system, including the life cycle, components, and flow of information within an organization.
7183.D1.9	Summarize how informatics can support the organization, including general management, operations, human resources, and financial management.
7183.D1.10	Discuss the importance of security within informatics, including its application in various aspects of the computing disciplines.
7183.D1.11	Discuss the importance of ethics, bias, and effective dissemination of technological knowledge.
Domain	***Programming Basics***
7183.D2.1	Identify the standard documentation tools of displaying algorithms such as pseudocode, flowchart symbols and UML.
7183.D2.2	Apply basic logical structures, file handling, matrices, and arrays to program algorithms.
7183.D2.3	Apply truth tables, Boolean logic, control structures, relational and logical operators to program algorithms
7183.D2.4	Use set theory and logic gate theory to develop program algorithms.
7183.D2.5	Document and express code and algorithms in an easily understandable manner using tools such as data flow diagrams, flowcharts, use case diagrams, activity diagrams, and state tables.
7183.D2.6	Develop a simple program and/or script using a compiled, object-oriented scripting language like Python.
7183.D2.7	Compare key techniques to visually represent data such as graphs, charts and tables.
7183.D2.8	Create applications that interact with users, demonstrating proper formatting of data.
7183.D2.9	Apply base numbering systems techniques to convert numeric data to any base numbering format, including binary, decimal, and hexadecimal.
7183.D2.10	Identify the uses of various programming and scripting languages in computer systems.
7183.D2.11	Compare and Contrast software development methodologies as it pertains to software development and problem solving.
7183.D2.12	Discuss the concepts and justifications for using secure design techniques.
7183.D2.13	Demonstrate secure code by means of data validation.
7183.D2.14	Describe the different methods for encoding data such as BCD, 1's complement, 2's complement, ASCII, and Unicode.
7183.D2.15	Describe the components of a computer architecture.
7183.D2.16	Understand and implement the fundamentals of an Integrated Development Environment (IDE).
7183.D2.17	Successfully identify and debug errors in applications produced by themselves or others.
7183.D2.18	Use puzzles and games to enhance problem-solving skills.
7183.D2.19	Apply critical thinking and problem-solving methodologies.
7183.D2.20	Show the ability to delegate tasks into user defined procedures for the purpose of efficiency.
Domain	***Career Navigation***
7183.D3.1	Explore career opportunities related to the program of study and understand how they relate

	to the global economy and marketplace.
7183.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7183.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7183.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7183.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7183.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7183.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7183.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7183.D5.1	Demonstrate computer literacy skills and basic computer functions.
7183.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7183.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7183.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Information Technology Fundamentals	
Career Cluster	Digital Technology
Program of Study	IT Operations, Networking, Cybersecurity, Informatics
NLPS Sequence	B
Course Code	7180
Course Description	*Information Technology Fundamentals provides the necessary competencies required for an entry-level Information Technology professional. Students will have the knowledge required to assemble components based on customer requirements, install, configure and maintain devices/software for end users, understand the basics of networking and security, properly and safely diagnose, resolve and document common hardware and software issues while applying troubleshooting skills. Students will also learn appropriate customer support, understand the basics of virtualization, desktop imaging, and deployment. This course should also prepare students for the CompTia A+ Certification Exam.*
Prerequisite(s)/ Corequisite(s)	Principles of Computing
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum

Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems ● Workplace Specialist: Information Technology: Information Support & Services	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	ITSP 132: IT Support Essentials I; ITSP 134: IT Support Essentials II; ITSP 136: Workforce Preparation: CompTIA A+ Certification	
VU Course Alignment	CMET 140: CompTIA A+; CMET 185: CompTIA A+ Certification Prep; CMET 195: CompTIA A+ Certification	
Four Yr. Course Alignment	PNW - ITS 13500: Operating Systems Technology, ITS 17000: Networking Technologies	
Postsecondary Credential	VU - CG Networking and Security Specialist (11.0901), A.S Networking and Security Specialist PNW – B.S. in Cybersecurity (11.1003/11.0103)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	CompTia A+	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Mobile Devices***	
7180.D1.1	Apply appropriate installation and configuration of laptop hardware, accessories, ports, components and features.	

7180.D1.2	Describe characteristics of various types of other mobile devices.
7180.D1.3	Confirm basic mobile device network connectivity, application support, and device synchronization.
Domain	***Networking***
7180.D2.1	Identify wired and wireless networking protocols, ports, services provided by network hosts and network configuration concepts.
7180.D2.2	Explain common networking hardware devices to include Routers, Switches, Wireless Access Points and Firewalls.
7180.D2.3	Build and configure a basic wired/wireless SOHO network.
7180.D2.4	Assess Internet connection types, network types, basic cable types, common connector types, and their features.
7180.D2.5	Examine the appropriate use of networking tools to include crimpers, cable strippers, multimer, tone generator and probe, cable tester, loopback plug, punch down tool and Wi-Fi analyzer. Install SOHO multifunctional devices and/or printers and configure appropriate settings.
Domain	***Hardware***
7180.D3.1	Select the appropriate installation and configuration of various RAM types, storage devices, motherboards, CPUs, and add-on cards.
7180.D3.2	Explain the purposes and uses of various peripheral types and power supplies.
7180.D3.3	Devise a plan to select and configure appropriate components for a custom PC configuration to meet customer specifications or needs.
7180.D3.4	Apply appropriate installation and configuration of SOHO multifunction devices/printers and maintenance of various print technologies.
7180.D3.5	Analyze common mobile device and printer issues; and common wired and wireless network problems.
Domain	***Virtualization and Cloud Computing***
7180.D4.1	Investigate cloud computing concepts and the deployment and configuration of client-side virtualization.
Domain	***Troubleshooting***
7180.D5.1	Assess best practice methodologies to resolve problems related to network problems, motherboards, RAM, CPUs, power, hard drive, RAID arrays, video projector and display issues.
Domain	***Operating Systems***
7180.D6.1	Compare common operating system types and their purposes including Microsoft Windows, Mac OS and Linux.
7180.D6.2	Demonstrate general installation and configuration of common operating systems including upgrades.
7180.D6.3	Evaluate common operating system features and tools, including scripting techniques.
Domain	***Security***
7180.D7.1	Explain the importance of physical security measures, logical security concepts, wireless security protocols. and authentication methods.
7180.D7.2	Differentiate social engineering, threats, and vulnerabilities; and the procedures to detect, remove and prevent malware using appropriate tools.
7180.D7.3	Implement security best practices to secure a workstation, mobile devices, SOHO wired and wireless networks; and appropriate data destruction and disposal methods.
Domain	***Hardware Issues***

7180.D8.1	Examine Microsoft Windows OS problems and resolve PC security issues to include malware identification and removal.
7180.D8.2	Analyze mobile OS and application issues and mobile application security issues.
Domain	***Operational Procedures***
7180.D9.1	Explain best practices associated with types of documentation, basic change management, basic disaster prevention and recovery.
7180.D9.2	Identify common computing safety procedures, environmental impacts and appropriate controls.
7180.D9.3	Explain the processes for addressing prohibited content/activity, and privacy, licensing, and policy concepts.
7180.D9.4	Apply proper communication techniques and professionalism.
Domain	***CompTIA A+ Certification***
7180.D10.1	Apply skills necessary to prepare for workforce employment.
7180.D10.2	Examine the objectives of the certification objectives.
7180.D10.3	Plan the approach to certification exam taking skills.
7180.D10.4	Explore the skills required in preparation for the workforce and the certification exam.

Networking and Cybersecurity Operations	
Career Cluster	Digital Technology
Program of Study	IT Operations, Cybersecurity (ITCC)
NLPS Sequence	C
Course Code	7181
Course Description	*Networking and Cybersecurity Operations will provide students with the fundamental concepts in networking and cybersecurity. Students are introduced to the principles and concepts of computer networking, covering the architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality. Students will be able to troubleshoot routers and switches and resolve common issues. The students will also explore the field of Cyber Security/Information Assurance focusing on the technical and managerial aspects of the discipline. Students will be introduced to the basic terminology, concepts, and best practices of computer/network security and the roles and responsibilities of management/security personnel. The students will learn the technologies used and techniques involved in creating a secure computer networking environment including authentication and the types of attacks against an organization.*
Prerequisite(s)/ Corequisite(s)	Principles of Computing; Information Technology Fundamentals
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Fulfills a science requirement for CORE 40 diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems ● Workplace Specialist: Information Technology: Information Support & Services	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	NETI 104: Introduction to Networking, CSIA 105: Introduction to Cyber Security/Information Assurance
VU Course Alignment	
Four Yr. Course Alignment	PNW - ITS 25000: Fundamentals of Information Assurance, ITS 27000: Internetworking Technologies
Postsecondary Credential	PNW – B.S in Cybersecurity (11.1003/11.0103)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Networking***
7181.D1.1	Define the ISO OSI and TCP/IP network models, identifying applicable layers and their appropriate devices, protocols, services, and applications.
7181.D1.2	Explain the configuration, characterization, characteristics, and application of network topologies, types, and technologies.
7181.D1.3	Examine cloud computing concepts, purposes, and technologies.
7181.D1.4	Implement network services such as DNS and DHCP.

7181.D1.5	Determine the appropriate selection, cabling and/or wireless connection(s), and basic configuration solution(s) for applicable network implementations.
7181.D1.6	Design IPv4 and IPv6 addressing schemes. Assess appropriate documentation, diagrams, business continuity, and disaster recovery concepts for a given scenario or scenarios.
7181.D1.7	Identify appropriate network operations components such as use policies, best practices, remote access methods, scanning, monitoring, and patching.
7181.D1.8	Assess appropriate devices, authentication and access controls, and detection and mitigation techniques to provide adequate network security under various conditions.
7181.D1.9	Given a scenario, provide appropriate network troubleshooting and setup using industry standard tools for wired and wireless network devices and services.
Domain	***Cybersecurity***
7181.D2.1	Use virtual machine technology to test security tools in a sandbox environment.
7181.D2.2	Identify security threats to network services, devices, traffic, and data.
7181.D2.3	Use tools to secure network communications.
7181.D2.4	Monitor the security infrastructure with current industry standard utilities.
7181.D2.5	Discuss roles and responsibilities of information security personnel.
7181.D2.6	Use cryptography and public key infrastructures to secure remote access, wireless, and virtual private networks.
7181.D2.7	Implement “defense in depth” to shield against network attacks.
7181.D2.8	Discuss computer forensics and incident response.
7181.D2.9	Discuss basic characteristics of information.
7181.D2.10	Discuss information security as it applies to application guidance, and policies.
7181.D2.11	Describe the legal elements of investigative authorities in criminal prosecution, evidence collection, and evidence preservation.
7181.D2.12	Understand the concepts of trust through assurance, mechanism, and policy.
7181.D2.13	Understand the practical performance measures employed in designing security measures and programs.
7181.D2.14	Describe and discuss administrative security procedural controls.
7181.D2.15	Discuss the auditing and monitoring of security systems.

IT Operations: Cybersecurity Operations Capstone	
Career Cluster	Digital Technology
Program of Study	Cybersecurity
NLPS Sequence	D
Course Code	7249
Course Description	*Cybersecurity Operations Capstone course introduces the core security concepts and skills needed to monitor, detect, analyze and respond to cybercrime, cyberespionage, insider threats, advanced persistent threats, regulatory requirements, and other cybersecurity issues facing organizations. It emphasizes the practical application of the skills needed to maintain and ensure security operational readiness of secure networked systems through an in-depth coverage of network protocols and ethical hacking. Through hands-on instruction students will be prepared to interact with TCP/IP on the vast majority of networks in use today and learn*

	threats and defense mechanisms. The skills developed in the curriculum prepares students for a career in the rapidly growing area of cybersecurity operations.
Prerequisite(s)/ Corequisite(s)	Principles of Computing; Information Technology Fundamentals; Networking and Cybersecurity Operations
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level II
Bulletin 400	● Business Education 7-12
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Information Support & Services
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Cybersecurity 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	CSIA 115: Cyber Ops; SVAD 111: Linux and Virtualization Technologies Fundamentals; CSIA 210: Network Protocol Analysis*; CSIA 225: Ethical Hacking*; CSIA 106: Workforce Preparation- CompTIA Security+ Certification*
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Cyber Security and Information Assurance (11.0401)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 115: Student Success in Computing and Informatics, MATH 136+ College Algebra or Higher
Promoted Certifications	CompTIA Security+

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Cybersecurity***
7249.D1.1	Use the command line for help, listing directories & files, and archiving files.
7249.D1.2	Write basic shell scripts using Linux commands.
7249.D1.3	Demonstrate knowledge of major operating systems and Linux distributions.
7249.D1.4	Determining the basic requirements for a computer on a Local Area Network (LAN) and configure the network interface card (NIC).
7249.D1.5	Create user accounts and groups and configure user passwords and user and group permissions.
7249.D1.6	Demonstrate knowledge of devices and how they interact with the system.
7249.D1.7	Configure devices using O.S. tools and commands.
7249.D1.8	Describe how virtualization software works.
7249.D1.9	Identify categories of virtualization software.
7249.D1.10	Select a virtualization software product based its features and system requirements.
7249.D1.11	Work with the administrative virtualization software consoles.
7249.D1.12	Use virtualization software to create and run virtual machines.
7249.D1.13	Install virtualization software.
7249.D1.14	Troubleshoot and repair systems using virtualization software.
Domain	***Cyber Operations***
7249.D2.1	Explain role of Cybersecurity Operations Analyst.
7249.D2.2	Utilize Operating Systems features needed to support cybersecurity analyses.
7249.D2.3	Explain the operation of network infrastructure and classify the various network attacks.
7249.D2.4	Analyze the operation of network protocols and services and use monitoring tools to identify attacks.
7249.D2.5	Use various methods to prevent malicious access to computer hosts and data.
7249.D2.6	Explain the impact of cryptography on network security monitoring.
7249.D2.7	Explain how to investigate and evaluate endpoint vulnerabilities and network security alerts.
7249.D2.8	Use virtual machines to implement, evaluate, and analyze cybersecurity threat events.
7249.D2.9	Analyze network intrusion data to identify compromised hosts and vulnerabilities.
7249.D2.10	Apply incident response model (CSIRSTs and NIST) to manage security incidents.
7249.D2.11	Understand how a SOC team detects and responds to security incidents, and how they protect their organization's information from modern threats.
7249.D2.12	Understand further how modern organizations are dealing with detecting and responding to cybercrime, cyberespionage, insider threats, advanced persistent threats, regulatory requirements, and other cybersecurity issues facing their organizations and their customers.
Domain	***Network Protocol***
7249.D3.1	Develop an understanding of basic IP packet structures.
7249.D3.2	Explore and explain the Data Link and Network Layer Protocols examining packet/frame types, hardware addresses, and the Neighbor Discovery Protocol.
7249.D3.3	Analyze routing and routed protocols with considerations for both IPv4 and IPv6 protocols and behaviors.
7249.D3.4	Examine ICMP testing and troubleshooting methods, security issues, and ICMP message types and codes.

7249.D3.5	Explain how neighbor discovery works on IPv6 networks.
7249.D3.6	Describe various auto-addressing schemes and mechanisms used on IPv4 and IPv6 networks.
7249.D3.7	Explain key services used to resolve symbolic, human-readable network names, and addresses into machine-intelligible network addresses.
7249.D3.8	Examine the common and appropriate uses of the TCP and UDP protocols.
7249.D3.9	Describe issues and techniques that apply when IPv4 and IPv6 must coexist on the same networks.
7249.D3.10	Examine tunneling mechanisms and protocols.
7249.D3.11	Understand, plan, deploy, and use IPv6 on modern TCP/IP networks.
7249.D3.12	Appraise general network security basics with a particular emphasis on IP security topics.
7249.D3.13	Review key topics including perimeter security, infrastructure security, and host device security.
Domain	***Ethical Hacking***
7249.D4.1	Demonstrate use of resources to perform system foot printing and enumeration.
7249.D4.2	Discuss the characteristics of Trojans, Viruses and worms.
7249.D4.3	Use sniffing tools to glean information about a network and demonstrate how social engineering and phishing work.
7249.D4.4	Defend against denial-of-service attacks and vulnerabilities associated with buffer overflows.
7249.D4.5	Hack Web servers and database servers and use password-cracking techniques.
7249.D4.6	Identify and protect against Web application vulnerabilities.
7249.D4.7	Hack Linux, Macintosh, routers, cable modems, firewalls, mobile devices, Bluetooth devices, RFID and USB devices.
7249.D4.8	Determine security policies for Linux, Macintosh, routers, cable modems, firewalls, mobile devices, Bluetooth devices, RFID and USB devices
7249.D4.9	Hack wireless networks and discuss physical security.
7249.D4.10	Evade IDS and Firewalls and detect the existence of honey pots.
7249.D4.11	Apply data security and controls and use basic cryptography for secure communications.

Digital Technology Informatics *(NEW)*							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7183	Principles of Computing	7180	Information Technology Fundamentals	7484	Data Analytics and Informatics Operations	7485	Informatics Capstone

Principles of Computing		
Career Cluster	Digital Technology	
Program of Study	Computer Science, Cybersecurity, IT Operations, Networking, Software Development, Informatics	
NLPS Sequence	A	
Course Code	7183	
Course Description	*Principles of Computing provides students the opportunity to explore how computers can be used in a wide variety of settings. The course will begin by exploring trends of computing and the necessary skills to implement information systems. Topics include operating systems, database technology, cybersecurity, cloud implementations and other concepts associated with applying the principles of good information management to the organization. Students will also have the opportunity to utilize basic programming skills to develop scripts designed to solve problems. Students will learn about algorithms, logic development and flowcharting.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Industrial Arts, Math or Science with Professional Development or additional training in Computer Science	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12 ● Occupational Specialist in “Computer Science” related course approved for a CTE pathway ● Industrial Technology/Education, Math or Science with Professional Development or	

	additional training in Computer Science
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development ● Workplace Specialist in "Computer Science" related course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist in related "Computer Science" course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SDEV 120: Computing Logic; INFM 109: Informatics Fundamentals
VU Course Alignment	COMP 177: Introduction to Programming Logic- Design and Development
Four Yr. Course Alignment	IUB - CSCI-C 106: Introduction to Computers and Their Uses PFW - CS 11200: Computer Science for Everyone PNW - ITS 10000: Information Technology Fundamentals; ITS 14000: Intro to Computer Algorithms and Logic
Postsecondary Credential	ITCC – CT Informatics, TC Informatics, B.A. Informatics VU - CG Information Technology (11.0103) IUB – B.S. Informatics (11.0104) PFW – A.S. Information Systems (11.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Computing Basics***
7183.D1.1	Discuss different aspects of the nature of information from a human and mechanical standpoint.
7183.D1.2	Demonstrate awareness of the history of computing.
7183.D1.3	Demonstrate a working knowledge of computer hardware basics and the ability to use the available productivity software.
7183.D1.4	Demonstrate a knowledge of Software, different categories, and how it is developed.

7183.D1.5	Understand cloud computing, virtualization, and the Internet
7183.D1.6	Discuss the basic use of data visualization, statistics, and reporting within an organization.
7183.D1.7	Discuss the concepts of logical and physical data storage as they apply locally and, in the cloud, including the use of database structures and storage area network technology.
7183.D1.8	Explain the fundamental concepts of an information system, including the life cycle, components, and flow of information within an organization.
7183.D1.9	Summarize how informatics can support the organization, including general management, operations, human resources, and financial management.
7183.D1.10	Discuss the importance of security within informatics, including its application in various aspects of the computing disciplines.
7183.D1.11	Discuss the importance of ethics, bias, and effective dissemination of technological knowledge.
Domain	***Programming Basics***
7183.D2.1	Identify the standard documentation tools of displaying algorithms such as pseudocode, flowchart symbols and UML.
7183.D2.2	Apply basic logical structures, file handling, matrices, and arrays to program algorithms.
7183.D2.3	Apply truth tables, Boolean logic, control structures, relational and logical operators to program algorithms
7183.D2.4	Use set theory and logic gate theory to develop program algorithms.
7183.D2.5	Document and express code and algorithms in an easily understandable manner using tools such as data flow diagrams, flowcharts, use case diagrams, activity diagrams, and state tables.
7183.D2.6	Develop a simple program and/or script using a compiled, object-oriented scripting language like Python.
7183.D2.7	Compare key techniques to visually represent data such as graphs, charts and tables.
7183.D2.8	Create applications that interact with users, demonstrating proper formatting of data.
7183.D2.9	Apply base numbering systems techniques to convert numeric data to any base numbering format, including binary, decimal, and hexadecimal.
7183.D2.10	Identify the uses of various programming and scripting languages in computer systems.
7183.D2.11	Compare and Contrast software development methodologies as it pertains to software development and problem solving.
7183.D2.12	Discuss the concepts and justifications for using secure design techniques.
7183.D2.13	Demonstrate secure code by means of data validation.
7183.D2.14	Describe the different methods for encoding data such as BCD, 1's complement, 2's complement, ASCII, and Unicode.
7183.D2.15	Describe the components of a computer architecture.
7183.D2.16	Understand and implement the fundamentals of an Integrated Development Environment (IDE).
7183.D2.17	Successfully identify and debug errors in applications produced by themselves or others.
7183.D2.18	Use puzzles and games to enhance problem-solving skills.
7183.D2.19	Apply critical thinking and problem-solving methodologies.
7183.D2.20	Show the ability to delegate tasks into user defined procedures for the purpose of efficiency.
Domain	***Career Navigation***
7183.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7183.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.

7183.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7183.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7183.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7183.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7183.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7183.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7183.D5.1	Demonstrate computer literacy skills and basic computer functions.
7183.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7183.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7183.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Information Technology Fundamentals	
Career Cluster	Digital Technology
Program of Study	IT Operations, Networking, Cybersecurity, Informatics
NLPS Sequence	B
Course Code	7180
Course Description	*Information Technology Fundamentals provides the necessary competencies required for an entry-level Information Technology professional. Students will have the knowledge required to assemble components based on customer requirements, install, configure and maintain devices/software for end users, understand the basics of networking and security, properly and safely diagnose, resolve and document common hardware and software issues while applying troubleshooting skills. Students will also learn appropriate customer support, understand the basics of virtualization, desktop imaging, and deployment. This course should also prepare students for the CompTia A+ Certification Exam.*
Prerequisite(s)/ Corequisite(s)	Principles of Computing
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)

Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems ● Workplace Specialist: Information Technology: Information Support & Services	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	ITSP 132: IT Support Essentials I; ITSP 134: IT Support Essentials II; ITSP 136: Workforce Preparation: CompTIA A+ Certification	
VU Course Alignment	CMET 140: CompTIA A+▼; CMET 185: CompTIA A+ Certification Prep▼; CMET 195: CompTIA A+ Certification▼	
Four Yr. Course Alignment	PNW - ITS 13500: Operating Systems Technology, ITS 17000: Networking Technologies	
Postsecondary Credential	ITCC – CT Informatics, TC Informatics, B.A. Informatics VU - CG Networking and Security Specialist (11.0901), A.S. in Networking and Security Specialist PNW – B.S. in Cybersecurity	
Liberal Arts/Sciences Requirements		
Promoted Certifications	CompTia A+	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Mobile Devices***	
7180.D1.1	Apply appropriate installation and configuration of laptop hardware, accessories, ports, components, and features.	

7180.D1.2	Describe characteristics of various types of other mobile devices.
7180.D1.3	Confirm basic mobile device network connectivity, application support, and device synchronization.
Domain	***Networking***
7180.D2.1	Identify wired and wireless networking protocols, ports, services provided by network hosts and network configuration concepts.
7180.D2.2	Explain common networking hardware devices to include Routers, Switches, Wireless Access Points and Firewalls.
7180.D2.3	Build and configure a basic wired/wireless SOHO network.
7180.D2.4	Assess Internet connection types, network types, basic cable types, common connector types, and their features.
7180.D2.5	Examine the appropriate use of networking tools to include crimpers, cable strippers, multimer, tone generator and probe, cable tester, loopback plug, punch down tool and Wi-Fi analyzer. Install SOHO multifunctional devices and/or printers and configure appropriate settings.
Domain	***Hardware***
7180.D3.1	Select the appropriate installation and configuration of various RAM types, storage devices, motherboards, CPUs, and add-on cards.
7180.D3.2	Explain the purposes and uses of various peripheral types and power supplies.
7180.D3.3	Devise a plan to select and configure appropriate components for a custom PC configuration to meet customer specifications or needs.
7180.D3.4	Apply appropriate installation and configuration of SOHO multifunction devices/printers and maintenance of various print technologies.
7180.D3.5	Analyze common mobile device and printer issues; and common wired and wireless network problems.
Domain	***Virtualization and Cloud Computing***
7180.D4.1	Investigate cloud computing concepts and the deployment and configuration of client-side virtualization.
Domain	***Troubleshooting***
7180.D5.1	Assess best practice methodologies to resolve problems related to network problems, motherboards, RAM, CPUs, power, hard drive, RAID arrays, video projector and display issues.
Domain	***Operating Systems***
7180.D6.1	Compare common operating system types and their purposes including Microsoft Windows, Mac OS and Linux.
7180.D6.2	Demonstrate general installation and configuration of common operating systems including upgrades.
7180.D6.3	Evaluate common operating system features and tools, including scripting techniques.
Domain	***Security***
7180.D7.1	Explain the importance of physical security measures, logical security concepts, wireless security protocols. and authentication methods.

7180.D7.2	Differentiate social engineering, threats, and vulnerabilities; and the procedures to detect, remove and prevent malware using appropriate tools.
7180.D7.3	Implement security best practices to secure a workstation, mobile devices, SOHO wired and wireless networks; and appropriate data destruction and disposal methods.
7180.D8.1	Examine Microsoft Windows OS problems and resolve PC security issues to include malware identification and removal.
7180.D8.2	Analyze mobile OS and application issues and mobile application security issues.
Domain	***Operational Procedures***
7180.D9.1	Explain best practices associated with types of documentation, basic change management, basic disaster prevention and recovery.
7180.D9.2	Identify common computing safety procedures, environmental impacts and appropriate controls.
7180.D9.3	Explain the processes for addressing prohibited content/activity, and privacy, licensing, and policy concepts.
7180.D9.4	Apply proper communication techniques and professionalism.
Domain	***CompTIA A+ Certification***
7180.D10.1	Apply skills necessary to prepare for workforce employment.
7180.D10.2	Examine the objectives of the certification objectives.
7180.D10.3	Plan the approach to certification exam taking skills.
7180.D10.4	Explore the skills required in preparation for the workforce and the certification exam.

Data Analytics and Informatics Operations	
Career Cluster	Digital Technology
Program of Study	Informatics
NLPS Sequence	C
Course Code	7484
Course Description	Data Analysis and Informatics Operations introduces students to the fundamentals of database structures, data management, and human-computer interaction (HCI). The course covers relational, hierarchical, network, and non-relational databases, along with data integrity, security, and unstructured data techniques such as Key-pair and JSON. Students will learn to use SQL commands for data manipulation and explore advanced concepts like big data, data warehousing, and data mining. Emphasis is placed on designing effective user interfaces, understanding user experience and usability, and applying HCI principles to create intuitive, accessible technologies. Through this course, students will develop the skills needed to analyze, design, and evaluate data systems and interactive interfaces in business setting
Prerequisite(s)/ Corequisite(s)	Principles of Computing, Information Technology Fundamentals

Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems ● Workplace Specialist: Information Technology: Information Support & Services	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	DBMS 110: Introduction to Data Analysis; INFM 209: Informatics and Human-Computer Interaction	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC – CT Informatics, TC Informatics, B.A. in Informatics	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	**Introduction to Data Analytics**	
7484.D1.1	Identify, define or describe the types and nature of databases in a business setting.	

7484.D1.2	Categorize data integrity and security requirements.
7484.D1.3	Compare and contrast the general structure and organization of relational, hierarchical, network database structures, and non-relational databases.
7484.D1.4	Discover unstructured data techniques including Key-pair and JSON.
7484.D1.5	Demonstrate an understanding of the relational data model.
7484.D1.6	Describe the field names, field types, and relationships among tables.
7484.D1.7	Demonstrate an understanding of normalization techniques in the design of databases utilizing 1NF, 2NF, & 3NF.
7484.D1.8	Retrieve, insert, update, and manipulate data using SQL commands without the use of advanced generative tools
7484.D1.9	Express the concepts and use of big data, data warehousing, and data mining.
Domain	**Informatics and Human-Computer Interactions**
7484.D2.1	Discuss the basic physiological, perceptual, and cognitive components of human learning and memory and their impact on human-computer interaction.
7484.D2.2	Investigate historical aspects of HCI and examine their impact upon society.
7484.D2.3	Examine the relationship between ergonomics and human-computer interaction
7484.D2.4	Differentiate between user experience and usability.
7484.D2.5	Assess design and evaluation techniques used to develop successful interactive technologies.
7484.D2.6	Analyze HCI problems from a technical, cognitive, and functional perspective.
7484.D2.7	Discuss why data visualization is an important part of human-computer interaction.
7484.D2.8	Explore the use of multimodal interfaces for system interaction.
7484.D2.9	Compare and contrast paradigms of HCI research and development (e.g. evaluation, description, and invention).
7484.D2.10	Describe special considerations in designing user interfaces for various demographics (e.g. age, visual, physical, audio limitations).
7484.D2.11	Design and develop interactive user interfaces for user input and information display.
7484.D2.12	Perform usability analyses evaluating the quality of user interfaces and displays.

Informatics Capstone	
Career Cluster	Digital Technology
Program of Study	Informatics
NLPS Sequence	D
Course Code	7485
Course Description	Informatics Capstone provides students with an opportunity to synthesize and apply their knowledge of business intelligence and data analysis in real-world settings. The course covers key concepts and techniques related to business intelligence, including data extraction, transformation, and loading, as well as data consistency, quality, and governance. Students will analyze both structured and unstructured data to generate insights, create data

	visualizations, and support data-driven decision-making, while also exploring the societal impacts and ethical considerations of these practices. Emphasis is placed on the value of business intelligence, decision support systems, and the importance of diversity and transparency in inclusive decision-making. Through internship experiences, students will gain practical insights, develop professional communication skills, and prepare to transition successfully into the workplace by documenting their learning and adapting to professional environments.	
Prerequisite(s)/ Corequisite(s)	Principles of Computing, Information Technology Fundamentals, Data Analytics and Informatics Operations	
Credits	2 semester course, 2 semesters required, 1-3 credit per semester, 6 credits maximum	
Counts Toward	Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems ● Workplace Specialist: Information Technology: Information Support & Services	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	INFM 219: Business Intelligence and Reporting; CPIN 280: Computing and Informatics CO-OP/Internship/Externship	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		

Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	**Business Intelligence and Reporting**
7485.D1.1	Identify key concepts and techniques related to business intelligence.
7485.D1.2	Employ common business intelligence tools to extract, transform, and load data to aid in data-driven decision making
7485.D1.3	Analyze data to generate information for decision making.
7485.D1.4	Discuss and explain the societal impacts and ethical dimensions of business intelligence and data analysis.
7485.D1.5	Identify and examine data in order to ensure consistency and quality.
7485.D1.6	Identify bad data and formatting for consistency following established data governance methodologies
7485.D1.7	Create reports utilizing common data visualization techniques to support business decision
7485.D1.8	Explain the value of business intelligence and decision support systems and technologies
7485.D1.9	Explain how to use data diversity and transparency to improve inclusion, belonging, and equity of business decision making
7485.D1.10	Analyze structured and unstructured data
Domain	**Computing and Informatics Co-Op/Internship/Externship**
7485.D2.1	Discuss and demonstrate how concepts and skills learned in the classroom environment apply to the work environment.
7485.D2.2	Discuss the importance of written and oral communication skills in the workplace.
7485.D2.3	Identify the most important technical knowledge and skills needed in the job assignment given to them.
7485.D2.4	Compare and contrast the student's expectations of the internship and actual experience.
7485.D2.5	Summarize the knowledge, skills, and experience gained on the internship and be able to apply these to the next job the student obtains
7485.D2.6	Learn how to adapt to the work environment.
7485.D2.7	Demonstrate acceptable interview skills.
7485.D2.8	Prepare a professional report documenting the co-op/internship experience.

Digital Technology Information Technology Operations							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7183	Principles of Computing	7180	Information Technology Fundamentals	7181	Networking and Cybersecurity Operations	7245	IT Support Capstone
						7247	Cloud and Server Operations Capstone

Principles of Computing		
Career Cluster	Digital Technology	
Program of Study	Computer Science, Cybersecurity, IT Operations, Networking, Software Development, Informatics	
NLPS Sequence	A	
Course Code	7183	
Course Description	*Principles of Computing provides students the opportunity to explore how computers can be used in a wide variety of settings. The course will begin by exploring trends of computing and the necessary skills to implement information systems. Topics include operating systems, database technology, cybersecurity, cloud implementations and other concepts associated with applying the principles of good information management to the organization. Students will also have the opportunity to utilize basic programming skills to develop scripts designed to solve problems. Students will learn about algorithms, logic development and flowcharting.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Industrial Arts, Math or Science with Professional Development or additional training in Computer Science	
Rules 46-47	● Business Education 9-12	

	● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12 ● Occupational Specialist in "Computer Science" related course approved for a CTE pathway ● Industrial Technology/Education, Math or Science with Professional Development or additional training in Computer Science
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development ● Workplace Specialist in "Computer Science" related course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist in related "Computer Science" course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SDEV 120: Computing Logic; INFM 109: Informatics Fundamentals
VU Course Alignment	COMP 177: Introduction to Programming Logic- Design and Development
Four Yr. Course Alignment	IUB - CSCI-C 106: Introduction to Computers and Their Uses PFW - CS 11200: Computer Science for Everyone PNW - ITS 10000: Information Technology Fundamentals; ITS 14000: Intro to Computer Algorithms and Logic
Postsecondary Credential	VU - CG Information Technology (11.0103) IUB – B.S. in Informatics (11.0104) PFW – A.S. in Information Systems (11.0101) PNW – B.S. in Cybersecurity
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Computing Basics***
7183.D1.1	Discuss different aspects of the nature of information from a human and mechanical standpoint.

7183.D1.2	Demonstrate awareness of the history of computing.
7183.D1.3	Demonstrate a working knowledge of computer hardware basics and the ability to use the available productivity software.
7183.D1.4	Demonstrate a knowledge of Software, different categories, and how it is developed.
7183.D1.5	Understand cloud computing, virtualization, and the Internet
7183.D1.6	Discuss the basic use of data visualization, statistics, and reporting within an organization.
7183.D1.7	Discuss the concepts of logical and physical data storage as they apply locally and, in the cloud, including the use of database structures and storage area network technology.
7183.D1.8	Explain the fundamental concepts of an information system, including the life cycle, components, and flow of information within an organization.
7183.D1.9	Summarize how informatics can support the organization, including general management, operations, human resources, and financial management.
7183.D1.10	Discuss the importance of security within informatics, including its application in various aspects of the computing disciplines.
7183.D1.11	Discuss the importance of ethics, bias, and effective dissemination of technological knowledge.
Domain	***Programming Basics***
7183.D2.1	Identify the standard documentation tools of displaying algorithms such as pseudocode, flowchart symbols and UML.
7183.D2.2	Apply basic logical structures, file handling, matrices, and arrays to program algorithms.
7183.D2.3	Apply truth tables, Boolean logic, control structures, relational and logical operators to program algorithms
7183.D2.4	Use set theory and logic gate theory to develop program algorithms.
7183.D2.5	Document and express code and algorithms in an easily understandable manner using tools such as data flow diagrams, flowcharts, use case diagrams, activity diagrams, and state tables.
7183.D2.6	Develop a simple program and/or script using a compiled, object-oriented scripting language like Python.
7183.D2.7	Compare key techniques to visually represent data such as graphs, charts and tables.
7183.D2.8	Create applications that interact with users, demonstrating proper formatting of data.
7183.D2.9	Apply base numbering systems techniques to convert numeric data to any base numbering format, including binary, decimal, and hexadecimal.
7183.D2.10	Identify the uses of various programming and scripting languages in computer systems.
7183.D2.11	Compare and Contrast software development methodologies as it pertains to software development and problem solving.
7183.D2.12	Discuss the concepts and justifications for using secure design techniques.
7183.D2.13	Demonstrate secure code by means of data validation.
7183.D2.14	Describe the different methods for encoding data such as BCD, 1's complement, 2's complement, ASCII, and Unicode.
7183.D2.15	Describe the components of a computer architecture.
7183.D2.16	Understand and implement the fundamentals of an Integrated Development Environment (IDE).
7183.D2.17	Successfully identify and debug errors in applications produced by themselves or others.
7183.D2.18	Use puzzles and games to enhance problem-solving skills.
7183.D2.19	Apply critical thinking and problem-solving methodologies.
7183.D2.20	Show the ability to delegate tasks into user defined procedures for the purpose of efficiency.
Domain	***Career Navigation***

7183.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7183.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7183.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7183.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7183.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7183.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7183.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7183.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7183.D5.1	Demonstrate computer literacy skills and basic computer functions.
7183.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7183.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7183.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Information Technology Fundamentals	
Career Cluster	Digital Technology
Program of Study	IT Operations, Cybersecurity, Networking, Informatics
NLPS Sequence	B
Course Code	7180
Course Description	*Information Technology Fundamentals provides the necessary competencies required for an entry-level Information Technology professional. Students will have the knowledge required to assemble components based on customer requirements, install, configure and maintain devices/software for end users, understand the basics of networking and security, properly and safely diagnose, resolve and document common hardware and software issues while applying troubleshooting skills. Students will also learn appropriate customer support, understand the basics of virtualization, desktop imaging, and deployment. This course should also prepare students for the CompTia A+ Certification Exam.*
Prerequisite(s)/ Corequisite(s)	Principles of Computing

Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems ● Workplace Specialist: Information Technology: Information Support & Services	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	ITSP 132: IT Support Essentials I; ITSP 134: IT Support Essentials II; ITSP 136: Workforce Preparation: CompTIA A+ Certification	
VU Course Alignment	CMET 140: CompTIA A+; CMET 185: CompTIA A+ Certification Prep; CMET 195: CompTIA A+ Certification	
Four Yr. Course Alignment	PNW - ITS 13500: Operating Systems Technology, ITS 17000: Networking Technologies	
Postsecondary Credential	VU - CG Networking and Security Specialist (11.0901); A.S. Networking & Security Specialist (11.0901) PNW – B.S. in Cybersecurity (11.1003/11.0103)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	CompTia A+	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	

Domain	***Mobile Devices***
7180.D1.1	Apply appropriate installation and configuration of laptop hardware, accessories, ports, components and features.
7180.D1.2	Describe characteristics of various types of other mobile devices.
7180.D1.3	Confirm basic mobile device network connectivity, application support, and device synchronization.
Domain	***Networking***
7180.D2.1	Identify wired and wireless networking protocols, ports, services provided by network hosts and network configuration concepts.
7180.D2.2	Explain common networking hardware devices to include Routers, Switches, Wireless Access Points and Firewalls.
7180.D2.3	Build and configure a basic wired/wireless SOHO network.
7180.D2.4	Assess Internet connection types, network types, basic cable types, common connector types, and their features.
7180.D2.5	Examine the appropriate use of networking tools to include crimpers, cable strippers, multimer, tone generator and probe, cable tester, loopback plug, punch down tool and Wi-Fi analyzer. Install SOHO multifunctional devices and/or printers and configure appropriate settings.
Domain	***Hardware***
7180.D3.1	Select the appropriate installation and configuration of various RAM types, storage devices, motherboards, CPUs, and add-on cards.
7180.D3.2	Explain the purposes and uses of various peripheral types and power supplies.
7180.D3.3	Devise a plan to select and configure appropriate components for a custom PC configuration to meet customer specifications or needs.
7180.D3.4	Apply appropriate installation and configuration of SOHO multifunction devices/printers and maintenance of various print technologies.
7180.D3.5	Analyze common mobile device and printer issues; and common wired and wireless network problems.
Domain	***Virtualization and Cloud Computing***
7180.D4.1	Investigate cloud computing concepts and the deployment and configuration of client-side virtualization.
Domain	***Troubleshooting***
7180.D5.1	Assess best practice methodologies to resolve problems related to network problems, motherboards, RAM, CPUs, power, hard drive, RAID arrays, video projector and display issues.
Domain	***Operating Systems***
7180.D6.1	Compare common operating system types and their purposes including Microsoft Windows, Mac OS and Linux.
7180.D6.2	Demonstrate general installation and configuration of common operating systems including upgrades.
7180.D6.3	Evaluate common operating system features and tools, including scripting techniques.
Domain	***Security***
7180.D7.1	Explain the importance of physical security measures, logical security concepts, wireless security protocols. and authentication methods.
7180.D7.2	Differentiate social engineering, threats, and vulnerabilities; and the procedures to detect, remove and prevent malware using appropriate tools.

7180.D7.3	Implement security best practices to secure a workstation, mobile devices, SOHO wired and wireless networks; and appropriate data destruction and disposal methods.
Domain	***Hardware Issues***
7180.D8.1	Examine Microsoft Windows OS problems and resolve PC security issues to include malware identification and removal.
7180.D8.2	Analyze mobile OS and application issues and mobile application security issues.
Domain	***Operational Procedures***
7180.D9.1	Explain best practices associated with types of documentation, basic change management, basic disaster prevention and recovery.
7180.D9.2	Identify common computing safety procedures, environmental impacts and appropriate controls.
7180.D9.3	Explain the processes for addressing prohibited content/activity, and privacy, licensing, and policy concepts.
7180.D9.4	Apply proper communication techniques and professionalism.
Domain	***CompTIA A+ Certification***
7180.D10.1	Apply skills necessary to prepare for workforce employment.
7180.D10.2	Examine the objectives of the certification objectives.
7180.D10.3	Plan the approach to certification exam taking skills.
7180.D10.4	Explore the skills required in preparation for the workforce and the certification exam.

Networking and Cybersecurity Operations	
Career Cluster	Digital Technology
Program of Study	IT Operations, Cybersecurity
NLPS Sequence	C
Course Code	7181
Course Description	*Networking and Cybersecurity Operations will provide students with the fundamental concepts in networking and cybersecurity. Students are introduced to the principles and concepts of computer networking, covering the architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality. Students will be able to troubleshoot routers and switches and resolve common issues. The students will also explore the field of Cyber Security/Information Assurance focusing on the technical and managerial aspects of the discipline. Students will be introduced to the basic terminology, concepts, and best practices of computer/network security and the roles and responsibilities of management/security personnel. The students will learn the technologies used and techniques involved in creating a secure computer networking environment including authentication and the types of attacks against an organization.*
Prerequisite(s)/ Corequisite(s)	Principles of Computing; Information Technology Fundamentals
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum

Counts Toward	Fulfills a science requirement for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems ● Workplace Specialist: Information Technology: Information Support & Services	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	NETI 104: Introduction to Networking, CSIA 105: Introduction to Cyber Security/Information Assurance	
VU Course Alignment		
Four Yr. Course Alignment	PNW - ITS 25000: Fundamentals of Information Assurance, ITS 27000: Internetworking Technologies	
Postsecondary Credential	PNW – B.S in Cybersecurity (11.1003/11.0103)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Networking***	
7181.D1.1	Define the ISO OSI and TCP/IP network models, identifying applicable layers and their appropriate devices, protocols, services, and applications.	

7181.D1.2	Explain the configuration, characterization, characteristics, and application of network topologies, types, and technologies.
7181.D1.3	Examine cloud computing concepts, purposes, and technologies.
7181.D1.4	Implement network services such as DNS and DHCP.
7181.D1.5	Determine the appropriate selection, cabling and/or wireless connection(s), and basic configuration solution(s) for applicable network implementations.
7181.D1.6	Design IPv4 and IPv6 addressing schemes. Assess appropriate documentation, diagrams, business continuity, and disaster recovery concepts for a given scenario or scenarios.
7181.D1.7	Identify appropriate network operations components such as use policies, best practices, remote access methods, scanning, monitoring, and patching.
7181.D1.8	Assess appropriate devices, authentication and access controls, and detection and mitigation techniques to provide adequate network security under various conditions.
7181.D1.9	Given a scenario, provide appropriate network troubleshooting and setup using industry standard tools for wired and wireless network devices and services.
Domain	***Cybersecurity***
7181.D2.1	Use virtual machine technology to test security tools in a sandbox environment.
7181.D2.2	Identify security threats to network services, devices, traffic, and data.
7181.D2.3	Use tools to secure network communications.
7181.D2.4	Monitor the security infrastructure with current industry standard utilities.
7181.D2.5	Discuss roles and responsibilities of information security personnel.
7181.D2.6	Use cryptography and public key infrastructures to secure remote access, wireless, and virtual private networks.
7181.D2.7	Implement “defense in depth” to shield against network attacks.
7181.D2.8	Discuss computer forensics and incident response.
7181.D2.9	Discuss basic characteristics of information.
7181.D2.10	Discuss information security as it applies to application guidance, and policies.
7181.D2.11	Describe the legal elements of investigative authorities in criminal prosecution, evidence collection, and evidence preservation.
7181.D2.12	Understand the concepts of trust through assurance, mechanism, and policy.
7181.D2.13	Understand the practical performance measures employed in designing security measures and programs.
7181.D2.14	Describe and discuss administrative security procedural controls.
7181.D2.15	Discuss the auditing and monitoring of security systems.

IT Operations: Cloud and Server Operations Capstone	
Career Cluster	Digital Technology
Program of Study	IT Operations
NLPS Sequence	D
Course Code	7247
Course Description	*Cloud and Server Operations Capstone provides students with the general understanding of cloud computing concepts through a detailed overview of core services security architecture, pricing and support. Students will also learn to implement, administer, and troubleshoot*

	Information systems using the Microsoft Windows clients and servers in an enterprise environment. Students will be introduced to managing applications, files, folders, and devices in a Windows active directory enrvironment. Additionally students have the chance to understand and apply Linux and Virtualization concepts.	
Prerequisite(s)/ Corequisite(s)	Principles of Computing; Information Technology Fundamentals; Networking and Cybersecurity Operations	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems ● Workplace Specialist: Information Technology: Information Support & Services	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SVAD 111: Linux and Virtualization Tech, SVAD 121: Enterprise Computing, SVAD 150: Cloud Fundamentals*	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		

Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Enterprise Computing***
7247.D1.1	Perform and troubleshoot an unattended installation of Windows servers and clients.
7247.D1.2	Deploy service packs and other critical updates.
7247.D1.3	Configure, troubleshoot, and control access to system resources such as files, printers, and web sites.
7247.D1.4	Manage and troubleshoot the use and synchronization of offline files.
7247.D1.5	Monitor and optimize usage of system resources, disk performance, compression, and quotas.
7247.D1.6	Manage, recover, and optimize availability of processes, System State data, and user data.
7247.D1.7	Configure and manage user profiles.
7247.D1.8	Manage applications by using Windows Installer packages.
7247.D1.9	Install, configure, and troubleshoot shared and remote access, virtual private network (VPN), and network protocols.
7247.D1.10	Configure and troubleshoot accessibility services.
7247.D1.11	Configure and troubleshoot the TCP/IP protocol.
7247.D1.12	Encrypt data on a hard disk by using Encrypting File System (EFS).
7247.D1.13	Implement, configure, manage, and troubleshoot policies in a Windows environment, including auditing, local accounts, and security.
Domain	***Linux and Virtualization Tech***
7247.D2.1	Use the command line for help, listing directories & files, and archiving files.
7247.D2.2	Write basic shell scripts using Linux commands.
7247.D2.3	Demonstrate knowledge of major operating systems and Linux distributions.
7247.D2.4	Determining the basic requirements for a computer on a Local Area Network (LAN) and configure the network interface card (NIC).
7247.D2.5	Create user accounts and groups and configure user passwords and user and group permissions.
7247.D2.6	Demonstrate knowledge of devices and how they interact with the system.
7247.D2.7	Configure devices using O.S. tools and commands.
7247.D2.8	Describe how virtualization software works.
7247.D2.9	Identify categories of virtualization software.
7247.D2.10	Select a virtualization software product based its features and system requirements.
7247.D2.11	Work with the administrative virtualization software consoles.
7247.D2.12	Use virtualization software to create and run virtual machines.
7247.D2.13	Install virtualization software.
7247.D2.14	Troubleshoot and repair systems using virtualization software.
Domain	***Cloud Foundations***
7247.D3.1	Describe cloud deployment models
7247.D3.2	Describe a cloud-based global infrastructure
7247.D3.3	Identify elements of the Total Cost of Ownership
7247.D3.4	Describe the Shared Responsibility model between the customer and cloud provider
7247.D3.5	Create and configure a virtual private cloud environment

7247.D3.6	Create and configure server instances and storage volumes
7247.D3.7	Discuss methods for implementing security in the cloud
7247.D3.8	Discuss different database solutions and discuss best use cases of each
7247.D3.9	Explain how load balancing and high availability are achieved in the cloud
7247.D3.10	List and explain the principles of a well-architected design
7247.D3.11	Apply Security and Compliance Controls in cloud environments

IT Operations: IT Support Capstone		
Career Cluster	Digital Technology	
Program of Study	IT Operations	
NLPS Sequence	D	
Course Code	7245	
Course Description	*IT Support Capstone students will acquire the skills and knowledge needed to provide tier 1 technical support services. The student will learn troubleshooting and problem solving in working with end users using various digital tools such as helpdesk software, knowledge bases, ticket management systems, and other tier 1 computer related support services. Students will also learn to implement, administer, and troubleshoot Information systems using the Microsoft Windows clients and servers in an enterprise environment. Students will be introduced to managing applications, files, folders, and devices in a Windows active directory enrvironment. Additionally students have the chance to understand and apply Linux and Virtualization concepts.*	
Prerequisite(s)/ Corequisite(s)	Principles of Computing; Information Technology Fundamentals; Networking and Cybersecurity Operations	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems	

	● Workplace Specialist: Information Technology: Information Support & Services
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SVAD 121: Enterprise Computing, SVAD 111: Linux and Virtualization Tech, ITSP 175: IT Customer Support and Helpdesk Software, DBMS 110: Introduction to Data Analytics
VU Course Alignment	
Four Yr. Course Alignment	PNW - ITS 37200: System Administration and Management
Postsecondary Credential	ITCC - CT Information Technology: Help Desk (11.1006), TC Information Technology Support (11.0103) PNW – B.S. in Cybersecurity (11.1003/11.0103)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 115 Student Success in Computing and Informatics
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Enterprise Computing***
7245.D1.1	Perform and troubleshoot an unattended installation of Windows servers and clients.
7245.D1.2	Deploy service packs and other critical updates.
7245.D1.3	Configure, troubleshoot, and control access to system resources such as files, printers, and web sites.
7245.D1.4	Manage and troubleshoot the use and synchronization of offline files.
7245.D1.5	Monitor and optimize usage of system resources, disk performance, compression, and quotas.
7245.D1.6	Manage, recover, and optimize availability of processes, System State data, and user data.
7245.D1.7	Configure and manage user profiles.
7245.D1.8	Manage applications by using Windows Installer packages.
7245.D1.9	Install, configure, and troubleshoot shared and remote access, virtual private network (VPN), and network protocols.
7245.D1.10	Configure and troubleshoot accessibility services.
7245.D1.11	Configure and troubleshoot the TCP/IP protocol.
7245.D1.12	Encrypt data on a hard disk by using Encrypting File System (EFS).
7245.D1.13	Implement, configure, manage, and troubleshoot policies in a Windows environment, including auditing, local accounts, and security.
Domain	***Linux and Virtualization Tech***

7245.D2.1	Use the command line for help, listing directories & files, and archiving files.
7245.D2.2	Write basic shell scripts using Linux commands.
7245.D2.3	Demonstrate knowledge of major operating systems and Linux distributions.
7245.D2.4	Determining the basic requirements for a computer on a Local Area Network (LAN) and configure the network interface card (NIC).
7245.D2.5	Create user accounts and groups and configure user passwords and user and group permissions.
7245.D2.5	Demonstrate knowledge of devices and how they interact with the system.
7245.D2.7	Configure devices using O.S. tools and commands.
7245.D2.8	Describe how virtualization software works.
7245.D2.9	Identify categories of virtualization software.
7245.D2.10	Select a virtualization software product based on its features and system requirements.
7245.D2.11	Work with the administrative virtualization software consoles.
7245.D2.12	Use virtualization software to create and run virtual machines.
7245.D2.13	Install virtualization software.
7245.D2.14	Troubleshoot and repair systems using virtualization software.
Domain	***IT Customer Support and Helpdesk Software***
7245.D3.1	Explain the evolution of help desk technical support as a profession in the IT industry.
7245.D3.2	Describe the roles and operations of different levels of IT customer support agents.
7245.D3.3	Define responsibilities and skill sets required to support a customer service help desk.
7245.D3.4	Recognize the most common practices used in help desk operations and how their performance is measured to improve quality support.
7245.D3.5	Identify and explore the tools and technology used in an IT customer help desk environment including appropriate ticketing systems.
7245.D3.6	Exhibit proficiency using the features and functionality of a helpdesk ticketing system.
7245.D3.7	Demonstrate professionalism in working with end users.
7245.D3.8	Develop work habits that promote organization and personal success.
7245.D3.9	Exhibit proper written and oral documentation and communication skills required of a help desk technician including training users in both internal and external environments.
7245.D3.10	Demonstrate proper troubleshooting techniques using problem-solving and critical-thinking skills.
7245.D3.11	Investigate methods of user needs analysis and assessment to select appropriate customer solutions.
Domain	***Introduction to Data Analytics***
7245.D4.1	Identify, define, or describe the types and nature of databases in a business setting.
7245.D4.2	Categorize data integrity and security requirements.
7245.D4.3	Compare and contrast the general structure and organization of relational, hierarchical, network database structures, and non-relational databases.
7245.D4.4	Discover unstructured data techniques including Key-pair and JSON.
7245.D4.5	Demonstrate an understanding of the relational data model.
7245.D4.6	Describe the field names, field types, and relationships among tables.
7245.D4.7	Demonstrate an understanding of normalization techniques in the design of databases utilizing 1NF, 2NF, & 3NF.

7245.D4.8	Retrieve, insert, update, and manipulate data using SQL commands without the use of advanced generative tools.
7245.D4.9	Express the concepts and use of big data, data warehousing, and data mining.

Digital Technology Networking							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7183	Principles of Computing	7180	Information Technology Fundamentals	7182	Networking Fundamentals	7251	Networking Capstone

Principles of Computing		
Career Cluster	Digital Technology	
Program of Study	Computer Science, Cybersecurity, IT Operations, Networking, Software Development, Informatics	
NLPS Sequence	A	
Course Code	7183	
Course Description	*Principles of Computing provides students the opportunity to explore how computers can be used in a wide variety of settings. The course will begin by exploring trends of computing and the necessary skills to implement information systems. Topics include operating systems, database technology, cybersecurity, cloud implementations and other concepts associated with applying the principles of good information management to the organization. Students will also have the opportunity to utilize basic programming skills to develop scripts designed to solve problems. Students will learn about algorithms, logic development and flowcharting.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Industrial Arts, Math or Science with Professional Development or additional training in Computer Science	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	

	● Occupational Specialist in "Computer Science" related course approved for a CTE pathway ● Industrial Technology/Education, Math or Science with Professional Development or additional training in Computer Science
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development ● Workplace Specialist in "Computer Science" related course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist in related "Computer Science" course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SDEV 120: Computing Logic; INFM 109: Informatics Fundamentals
VU Course Alignment	COMP 177: Introduction to Programming Logic- Design and Development
Four Yr. Course Alignment	IUB - CSCI-C 106: Introduction to Computers and Their Uses PFW - CS 11200: Computer Science for Everyone PNW - ITS 10000: Information Technology Fundamentals; ITS 14000: Intro to Computer Algorithms and Logic
Postsecondary Credential	VU - CG Information Technology (11.0103) IUB – B.S. Informatics (11.0104) PFW – A.S. Information Systems (11.0101) PNW – B.S. Cybersecurity
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Computing Basics***
7183.D1.1	Discuss different aspects of the nature of information from a human and mechanical standpoint.
7183.D1.2	Demonstrate awareness of the history of computing.
7183.D1.3	Demonstrate a working knowledge of computer hardware basics and the ability to use the

	available productivity software.
7183.D1.4	Demonstrate a knowledge of Software, different categories, and how it is developed.
7183.D1.5	Understand cloud computing, virtualization, and the Internet
7183.D1.6	Discuss the basic use of data visualization, statistics, and reporting within an organization.
7183.D1.7	Discuss the concepts of logical and physical data storage as they apply locally and, in the cloud, including the use of database structures and storage area network technology.
7183.D1.8	Explain the fundamental concepts of an information system, including the life cycle, components, and flow of information within an organization.
7183.D1.9	Summarize how informatics can support the organization, including general management, operations, human resources, and financial management.
7183.D1.10	Discuss the importance of security within informatics, including its application in various aspects of the computing disciplines.
7183.D1.11	Discuss the importance of ethics, bias, and effective dissemination of technological knowledge.
Domain	***Programming Basics***
7183.D2.1	Identify the standard documentation tools of displaying algorithms such as pseudocode, flowchart symbols and UML.
7183.D2.2	Apply basic logical structures, file handling, matrices, and arrays to program algorithms.
7183.D2.3	Apply truth tables, Boolean logic, control structures, relational and logical operators to program algorithms
7183.D2.4	Use set theory and logic gate theory to develop program algorithms.
7183.D2.5	Document and express code and algorithms in an easily understandable manner using tools such as data flow diagrams, flowcharts, use case diagrams, activity diagrams, and state tables.
7183.D2.6	Develop a simple program and/or script using a compiled, object-oriented scripting language like Python.
7183.D2.7	Compare key techniques to visually represent data such as graphs, charts and tables.
7183.D2.8	Create applications that interact with users, demonstrating proper formatting of data.
7183.D2.9	Apply base numbering systems techniques to convert numeric data to any base numbering format, including binary, decimal, and hexadecimal.
7183.D2.10	Identify the uses of various programming and scripting languages in computer systems.
7183.D2.11	Compare and Contrast software development methodologies as it pertains to software development and problem solving.
7183.D2.12	Discuss the concepts and justifications for using secure design techniques.
7183.D2.13	Demonstrate secure code by means of data validation.
7183.D2.14	Describe the different methods for encoding data such as BCD, 1's complement, 2's complement, ASCII, and Unicode.
7183.D2.15	Describe the components of a computer architecture.
7183.D2.16	Understand and implement the fundamentals of an Integrated Development Environment (IDE).
7183.D2.17	Successfully identify and debug errors in applications produced by themselves or others.
7183.D2.18	Use puzzles and games to enhance problem-solving skills.
7183.D2.19	Apply critical thinking and problem-solving methodologies.
7183.D2.20	Show the ability to delegate tasks into user defined procedures for the purpose of efficiency.
Domain	***Career Navigation***
7183.D3.1	Explore career opportunities related to the program of study and understand how they relate

	to the global economy and marketplace.
7183.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7183.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7183.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7183.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7183.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7183.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7183.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7183.D5.1	Demonstrate computer literacy skills and basic computer functions.
7183.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7183.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7183.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Information Technology Fundamentals	
Career Cluster	Digital Technology
Program of Study	IT Operations, Cybersecurity, Networking, Informatics
NLPS Sequence	B
Course Code	7180
Course Description	*Information Technology Fundamentals provides the necessary competencies required for an entry-level Information Technology professional. Students will have the knowledge required to assemble components based on customer requirements, install, configure and maintain devices/software for end users, understand the basics of networking and security, properly and safely diagnose, resolve and document common hardware and software issues while applying troubleshooting skills. Students will also learn appropriate customer support, understand the basics of virtualization, desktop imaging, and deployment. This course should also prepare students for the CompTia A+ Certification Exam.*
Prerequisite(s)/ Corequisite(s)	Principles of Computing
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum

Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems ● Workplace Specialist: Information Technology: Information Support & Services	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	ITSP 132: IT Support Essentials I; ITSP 134: IT Support Essentials II; ITSP 136: Workforce Preparation: CompTIA A+ Certification	
VU Course Alignment	CMET 140: CompTIA A+▼; CMET 185: CompTIA A+ Certification Prep▼; CMET 195: CompTIA A+ Certification▼	
Four Yr. Course Alignment	PNW - ITS 13500: Operating Systems Technology, ITS 17000: Networking Technologies	
Postsecondary Credential	VU - CG Networking & Security Specialist; A.S. Networking & Security Specialist (11.0901) PNW – B.S. Cybersecurity (11.1003/11.0103)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	CompTia A+	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Mobile Devices***	
7180.D1.1	Apply appropriate installation and configuration of laptop hardware, accessories, ports,	

	components, and features.
7180.D1.2	Describe characteristics of various types of other mobile devices.
7180.D1.3	Confirm basic mobile device network connectivity, application support, and device synchronization.
Domain	***Networking***
7180.D2.1	Identify wired and wireless networking protocols, ports, services provided by network hosts and network configuration concepts.
7180.D2.2	Explain common networking hardware devices to include Routers, Switches, Wireless Access Points and Firewalls.
7180.D2.3	Build and configure a basic wired/wireless SOHO network.
7180.D2.4	Assess Internet connection types, network types, basic cable types, common connector types, and their features.
7180.D2.5	Examine the appropriate use of networking tools to include crimpers, cable strippers, multimer, tone generator and probe, cable tester, loopback plug, punch down tool and Wi-Fi analyzer. Install SOHO multifunctional devices and/or printers and configure appropriate settings.
Domain	***Hardware***
7180.D3.1	Select the appropriate installation and configuration of various RAM types, storage devices, motherboards, CPUs, and add-on cards.
7180.D3.2	Explain the purposes and uses of various peripheral types and power supplies.
7180.D3.3	Devise a plan to select and configure appropriate components for a custom PC configuration to meet customer specifications or needs.
7180.D3.4	Apply appropriate installation and configuration of SOHO multifunction devices/printers and maintenance of various print technologies.
7180.D3.5	Analyze common mobile device and printer issues; and common wired and wireless network problems.
Domain	***Virtualization and Cloud Computing***
7180.D4.1	Investigate cloud computing concepts and the deployment and configuration of client-side virtualization.
Domain	***Troubleshooting***
7180.D5.1	Assess best practice methodologies to resolve problems related to network problems, motherboards, RAM, CPUs, power, hard drive, RAID arrays, video projector and display issues.
Domain	***Operating Systems***
7180.D6.1	Compare common operating system types and their purposes including Microsoft Windows, Mac OS and Linux.
7180.D6.2	Demonstrate general installation and configuration of common operating systems including upgrades.
7180.D6.3	Evaluate common operating system features and tools, including scripting techniques.
Domain	***Security***
7180.D7.1	Explain the importance of physical security measures, logical security concepts, wireless

	security protocols. and authentication methods.
7180.D7.2	Differentiate social engineering, threats, and vulnerabilities; and the procedures to detect, remove and prevent malware using appropriate tools.
7180.D7.3	Implement security best practices to secure a workstation, mobile devices, SOHO wired and wireless networks; and appropriate data destruction and disposal methods.
7180.D8.1	Examine Microsoft Windows OS problems and resolve PC security issues to include malware identification and removal.
7180.D8.2	Analyze mobile OS and application issues and mobile application security issues.
Domain	***Operational Procedures***
7180.D9.1	Explain best practices associated with types of documentation, basic change management, basic disaster prevention and recovery.
7180.D9.2	Identify common computing safety procedures, environmental impacts and appropriate controls.
7180.D9.3	Explain the processes for addressing prohibited content/activity, and privacy, licensing, and policy concepts.
7180.D9.4	Apply proper communication techniques and professionalism.
Domain	***CompTIA A+ Certification***
7180.D10.1	Apply skills necessary to prepare for workforce employment.
7180.D10.2	Examine the objectives of the certification objectives.
7180.D10.3	Plan the approach to certification exam taking skills.
7180.D10.4	Explore the skills required in preparation for the workforce and the certification exam.

Networking Fundamentals	
Career Cluster	Digital Technology
Program of Study	Networking
NLPS Sequence	C
Course Code	7182
Course Description	*Networking Fundamentals describes, explores and demonstrates how a network operates in our everyday lives. The course covers the technical pieces and parts of a network and also societal implications such as security and data integrity. Using hands-on lab work, this course offers students the critical information needed for a role as an Information Technology professional who support computer networks. Concepts covered include the TCP/IP model, OS administration, designing a network topology, configuring the TCP/IP protocols, managing network devices and clients, configuring routers and switches, wireless technology and troubleshooting. Provides students the ability to implement, administer, and troubleshoot information systems that incorporate the Microsoft Windows clients and servers in an enterprise environment. Students will be introduced to managing applications, files, folders, and devices in a windows active directory environment.*

Prerequisite(s)/ Corequisite(s)	Principles of Computing; Information Technology Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems ● Workplace Specialist: Information Technology: Information Support & Services	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	NETI 109: Networking I; SVAD 121: Enterprise Computing	
VU Course Alignment	CNET 215: CompTIA Network+ VU-EC – CPNS 175: Microsoft Certification	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - TC Networking Infrastructure (11.0901) VU - A.S. Networking & Security Specialist (11.0901) VU-EC - CG Computer Networking Fundamentals (11.0901)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		

Competency #	Competency
Domain	***Networking***
7182.D1.1	Configure switches and end devices to provide access to local and remote network resources.
7182.D1.2	Explain how physical and data link layer protocols support the operation of Ethernet in a switched network.
7182.D1.3	Configure routers to enable end-to-end connectivity between remote devices.
7182.D1.4	Create IPv4 and IPv6 addressing schemes and verify network connectivity between devices.
7182.D1.5	Explain how the upper layers of the OSI model support network applications.
7182.D1.6	Configure a small network with security best practices.
7182.D1.7	Troubleshoot connectivity in a small network.
Domain	***Enterprise Computing and Security***
7182.D2.1	Perform and troubleshoot an unattended installation of Windows servers and clients.
7182.D2.2	Deploy service packs and other critical updates.
7182.D2.3	Configure, troubleshoot, and control access to system resources such as files, printers, and web sites.
7182.D2.4	Manage and troubleshoot the use and synchronization of offline files.
7182.D2.5	Monitor and optimize usage of system resources, disk performance, compression, and quotas.
7182.D2.6	Manage, recover, and optimize availability of processes, System State data, and user data.
7182.D2.7	Configure and manage user profiles.
7182.D2.8	Manage applications by using Windows Installer packages.
7182.D2.9	Install, configure, and troubleshoot shared and remote access, virtual private network (VPN), and network protocols.
7182.D2.10	Configure and troubleshoot accessibility services.
7182.D2.11	Configure and troubleshoot the TCP/IP protocol.
7182.D2.12	Encrypt data on a hard disk by using Encrypting File System (EFS).
7182.D2.13	Implement, configure, manage, and troubleshoot policies in a Windows environment, including auditing, local accounts, and security.

Networking Capstone	
Career Cluster	Digital Technology
Program of Study	Networking
NLPS Sequence	D
Course Code	7251
Course Description	*Networking Capstone includes hands-on lab work, and a wide array of assessment types and tools. The course covers the architecture, components, and operations of routers and switches in small networks and introduces wireless local area networks (WLAN) and security concepts. Students learn how to configure and troubleshoot routers and switches for advanced functionality using security best practices and resolve common issues with protocols in both IPv4 and IPv6 networks. The course also emphasizes network security concepts and introduces network virtualization and automation. Students learn how to configure, troubleshoot, and secure enterprise network devices and understand how application programming interfaces*

	(API) and configuration management tools enable network automation.
Prerequisite(s)/ Corequisite(s)	Principles of Computing; Information Technology Fundamentals; Networking Fundamentals
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level II
Bulletin 400	● Business Education 7-12
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Computer Operations & Programming: Management Info Systems ● Workplace Specialist: Information Technology: Information Support & Services
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Information Technology: Information Support & Services 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SVAD 111: Linux and Virtualization Technologies Fundamentals; NETI 119: Networking II; NETI 209: Networking III; NETI 219: Workforce Preparation – Cisco Certified Network Associate (CCNA) Certification*
VU Course Alignment	CPNS 101: LAN Basics and OSI Model▼; CPNS 102: WAN Basics and Routers▼; ELEC 130: Digital Logic I▼; ELEC 105: Electronic Circuit Analysis I▼; CMET 220: CompTIA Network+ Certification▼
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Networking Infrastructure (11.0901) VU - CG Networking & Security Specialist; AS Networking & Security Specialist (11.0901)
Liberal Arts/Sciences Requirements	

Promoted Certifications	CCNA; CompTIA Network+
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Advanced Networking***
7251.D1.1	Configure VLANs and Inter-VLAN routing applying security best practices.
7251.D1.2	Troubleshoot inter-VLAN routing on Layer 3 devices.
7251.D1.3	Configure redundancy on a switched network using STP and EtherChannel.
7251.D1.4	Troubleshoot EtherChannel on switched networks.
7251.D1.5	Explain how to support available and reliable networks using dynamic addressing and first-hop redundancy protocols.
7251.D1.6	Configure dynamic address allocation in IPv6 networks.
7251.D1.7	Configure WLANs using a WLC and L2 security best practices.
7251.D1.8	Configure switch security to mitigate LAN attacks.
7251.D1.9	Configure IPv4 and IPv6 static routing on routers.
Domain	***Advanced Networking***
7251.D2.1	Configure single-area OSPFv2 in both point-to-point and multiaccess networks.
7251.D2.2	Explain how to mitigate threats and enhance network security using access control lists and security best practices.
7251.D2.3	Implement standard IPv4 ACLs to filter traffic and secure administrative access.
7251.D2.4	Configure NAT services on the edge router to provide IPv4 address scalability.
7251.D2.5	Explain techniques to provide address scalability and secure remote access for WANs.
7251.D2.6	Explain how to optimize, monitor, and troubleshoot scalable network architectures.
7251.D2.7	Explain how networking devices implement QoS
7251.D2.8	Implement protocols to manage the network.
7251.D2.9	Explain how technologies such as virtualization, software defined networking, and automation affect evolving networks.
Domain	***Operating Systems***
7251.D3.1	Use the command line for help, listing directories & files, and archiving files.
7251.D3.2	Write basic shell scripts using Linux commands.
7251.D3.3	Demonstrate knowledge of major operating systems and Linux distributions.
7251.D3.4	Determining the basic requirements for a computer on a Local Area Network (LAN) and configure the network interface card (NIC).
7251.D3.5	Create user accounts and groups and configure user passwords and user and group permissions.
7251.D3.6	Demonstrate knowledge of devices and how they interact with the system.
7251.D3.7	Configure devices using O.S. tools and commands.
7251.D3.8	Describe how virtualization software works.
7251.D3.9	Identify categories of virtualization software.
7251.D3.10	Select a virtualization software product based on its features and system requirements.
7251.D3.11	Work with the administrative virtualization software consoles.
7251.D3.12	Use virtualization software to create and run virtual machines.
7251.D3.13	Install virtualization software.
7251.D3.14	Troubleshoot and repair systems using virtualization software.

Digital Technology Software Development							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7183	Principles of Computing	7185	Website and Database Development	7184	Software Development	7253	Software Development Capstone

Principles of Computing		
Career Cluster	Digital Technology	
Program of Study	Computer Science, Cybersecurity, IT Operations, Networking, Software Development, Informatics	
NLPS Sequence	A	
Course Code	7183	
Course Description	*Principles of Computing provides students the opportunity to explore how computers can be used in a wide variety of settings. The course will begin by exploring trends of computing and the necessary skills to implement information systems. Topics include operating systems, database technology, cybersecurity, cloud implementations and other concepts associated with applying the principles of good information management to the organization. Students will also have the opportunity to utilize basic programming skills to develop scripts designed to solve problems. Students will learn about algorithms, logic development and flowcharting.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Industrial Arts, Math or Science with Professional Development or additional training in Computer Science	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	

	● Occupational Specialist in "Computer Science" related course approved for a CTE pathway ● Industrial Technology/Education, Math or Science with Professional Development or additional training in Computer Science
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development ● Workplace Specialist in "Computer Science" related course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist in related "Computer Science" course approved for a CTE pathway ● Technology Education, Math or Science with Professional Development or additional training in Computer Science
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SDEV 120: Computing Logic; INFM 109: Informatics Fundamentals
VU Course Alignment	COMP 177: Introduction to Programming Logic- Design and Development
Four Yr. Course Alignment	IUB - CSCI-C 106: Introduction to Computers and Their Uses PFW - CS 11200: Computer Science for Everyone PNW - ITS 10000: Information Technology Fundamentals; ITS 14000: Intro to Computer Algorithms and Logic
Postsecondary Credential	VU - CG Information Technology (11.0103) IUB – B.S. in Informatics (11.0104) PFW – A.S. in Information Systems (11.0101) PNW – B.S. in Cybersecurity (11.1003/11.0103)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Computing Basics***
7183.D1.1	Discuss different aspects of the nature of information from a human and mechanical standpoint.
7183.D1.2	Demonstrate awareness of the history of computing.
7183.D1.3	Demonstrate a working knowledge of computer hardware basics and the ability to use the

	available productivity software.
7183.D1.4	Demonstrate a knowledge of Software, different categories, and how it is developed.
7183.D1.5	Understand cloud computing, virtualization, and the Internet
7183.D1.6	Discuss the basic use of data visualization, statistics, and reporting within an organization.
7183.D1.7	Discuss the concepts of logical and physical data storage as they apply locally and, in the cloud, including the use of database structures and storage area network technology.
7183.D1.8	Explain the fundamental concepts of an information system, including the life cycle, components, and flow of information within an organization.
7183.D1.9	Summarize how informatics can support the organization, including general management, operations, human resources, and financial management.
7183.D1.10	Discuss the importance of security within informatics, including its application in various aspects of the computing disciplines.
7183.D1.11	Discuss the importance of ethics, bias, and effective dissemination of technological knowledge.
Domain	***Programming Basics***
7183.D2.1	Identify the standard documentation tools of displaying algorithms such as pseudocode, flowchart symbols and UML.
7183.D2.2	Apply basic logical structures, file handling, matrices, and arrays to program algorithms.
7183.D2.3	Apply truth tables, Boolean logic, control structures, relational and logical operators to program algorithms
7183.D2.4	Use set theory and logic gate theory to develop program algorithms.
7183.D2.5	Document and express code and algorithms in an easily understandable manner using tools such as data flow diagrams, flowcharts, use case diagrams, activity diagrams, and state tables.
7183.D2.6	Develop a simple program and/or script using a compiled, object-oriented scripting language like Python.
7183.D2.7	Compare key techniques to visually represent data such as graphs, charts, and tables.
7183.D2.8	Create applications that interact with users, demonstrating proper formatting of data.
7183.D2.9	Apply base numbering systems techniques to convert numeric data to any base numbering format, including binary, decimal, and hexadecimal.
7183.D2.10	Identify the uses of various programming and scripting languages in computer systems.
7183.D2.11	Compare and Contrast software development methodologies as it pertains to software development and problem solving.
7183.D2.12	Discuss the concepts and justifications for using secure design techniques.
7183.D2.13	Demonstrate secure code by means of data validation.
7183.D2.14	Describe the different methods for encoding data such as BCD, 1's complement, 2's complement, ASCII, and Unicode.
7183.D2.15	Describe the components of a computer architecture.
7183.D2.16	Understand and implement the fundamentals of an Integrated Development Environment (IDE).
7183.D2.17	Successfully identify and debug errors in applications produced by themselves or others.
7183.D2.18	Use puzzles and games to enhance problem-solving skills.
7183.D2.19	Apply critical thinking and problem-solving methodologies.
7183.D2.20	Show the ability to delegate tasks into user defined procedures for the purpose of efficiency.
Domain	***Career Navigation***
7183.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.

7183.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7183.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7183.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7183.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7183.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7183.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7183.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7183.D5.1	Demonstrate computer literacy skills and basic computer functions.
7183.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7183.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7183.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Website and Database Development	
Career Cluster	Digital Technology
Program of Study	Software Development
NLPS Sequence	B
Course Code	7185
Course Description	*Website and Database Development will provide students a basic understanding of the essential Web and Database skills and business practices that directly relate to Internet technologies used in Web site and Database design and development. Students will learn to develop Web sites using Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS). Additionally students will be introduced to the basic concepts of databases including types of databases, general database environments, database design, normalization and development of tables, queries, reports, and applications. Students will be familiarized with the use of ANSI Standard Structured Query Language. Students will be introduced to data concepts such as data warehousing, data mining, and BIG Data. Students will develop a business application using database software such as Microsoft Access.*
Prerequisite(s)/ Corequisite(s)	Principles of Computing

Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development & Network Systems	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Networking 9-12 ● Workplace Specialist: Info Technology: Program & Software Development 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SDEV 153: Website Development; DBMS 110: Introduction to Data Analytics	
VU Course Alignment	COMP 107: Web Page Design ▾ ; COMP 185: Introduction to Databases ▾	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - TC Software Development (11.0101) VU - CG Information Technology (11.0103)	
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, COMM 101: Fundamentals of Public Speaking, IVYT 115: Student Success in Computing and Informatics, MATH 136+ College Algebra or Higher VU - ENGL 101: English Composition I, ENGL 102: English Composition II, MATH 103: Quantitative Reasoning	
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		

Competency #	Competency
Domain	***Website Development***
7185.D1.1	Identify and define important evolutionary changes in modern markup and style languages.
7185.D1.2	Define and apply essential semantic and logical elements of HTML.
7185.D1.3	Use CSS to apply style to a single HTML element, a single Web page, and an entire Web site.
7185.D1.4	Create wireframes for a variety of viewports including mobile and desktop.
7185.D1.5	Write valid and responsive HTML and CSS code based on a wireframe.
7185.D1.6	Develop Web pages and sites using current industry and W3C standards without the support of WYSIWYG software.
7185.D1.7	Understand appropriate application of Tables to complete web sites.
7185.D1.8	Develop Web pages and sites that follow the “Mobile First” and “Responsive Web Design” (RWD) approach to Web development.
7185.D1.9	Identify essential ethical and legal issues in developing and maintaining a Web site.
7185.D1.10	Apply the phases of the SDLC and the principles of project management to design, develop, test, implement, and maintain a Web site.
7185.D1.11	Use Creative Commons licensing and attributions to offer usage rights, reserve other rights, and comply with existing copyright licenses for images and multimedia elements on a Web site.
7185.D1.12	Apply common techniques to improve search engine rankings and enhance the marketing of a Web site.
7185.D1.13	Trace and explain programs in JavaScript or other client-side scripting languages encoding operators, variables, arrays, control structures, events, and functions.
7185.D1.14	Explain the behavior of HTTP including GET and POST.
7185.D1.15	Examine secure programming including HTTPS and languages such as SQL injections.
7185.D1.16	Define data and evaluate its need for decision-making in a business setting.
7185.D1.17	Identify, define, or describe the types and nature of databases in a business setting.
Domain	***Database Design and Management***
7185.D2.1	Define data and evaluate its need for decision-making in a business setting.
7185.D2.2	Identify, define, or describe the types and nature of databases in a business setting.
7185.D2.3	Compare and contrast the general structure and organization of relational, hierarchical, and network database structures.
7185.D2.4	Demonstrate an understanding of the relational data model.
7185.D2.5	Given a scenario, plan, design, create and modify a database schema.
7185.D2.6	Document a database by creating entity-relationship diagrams (ERDs), describing the field names, field types, and relationships among tables.
7185.D2.7	Apply normalization techniques to the design of databases, and define and describe the 1NF, 2NF, 3NF, and BCNF.
7185.D2.8	Define and describe higher normal forms.
7185.D2.9	Discover unstructured data techniques including Key-pair and JSON.
7185.D2.10	Retrieve, insert, update, and manipulate data using SQL commands.
7185.D2.11	Create and manage tables and databases using an integrated environment like SQL Management Studio.
7185.D2.12	Successfully identify and debug errors in SQL queries.
7185.D2.13	Create and manage user roles on a SQL database server.
7185.D2.14	Define stored procedures, triggers, views and functions.

7185.D2.15	Identify data integrity and security requirements.
7185.D2.16	Discuss the concepts and use of big data, data warehousing, and data mining.
7185.D2.17	Discuss the use and implementation of distributed database systems.

Software Development		
Career Cluster	Digital Technology	
Program of Study	Software Development	
NLPS Sequence	C	
Course Code	7184	
Course Description	*Software Development introduces students to concepts and practices of programming languages and software development. Students are introduced to algorithms and development tools used to document/implement computer logic. Discusses the history of software development, the different types of programming such as real time processing, web/database applications, and different program development environments. Concepts will be applied using different programming languages, and students will develop and test working programs in an integrated system.*	
Prerequisite(s)/ Corequisite(s)	Principles of Computing	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development & Network Systems	
REPA/REPA 3	● Computer Education 5-12, P-12 ● Computer Science 5-12, P-12 ● Business 5-12	

	● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Networking 9-12 ● Workplace Specialist: Info Technology: Program & Software Development 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SDEV 140: Introduction to Software Development. CSCI 179: Computer Science Bridging Course
VU Course Alignment	VU-EC - COMP 203: Object Oriented Programming
Four Yr. Course Alignment	PFW - CS 11400: Introduction to Visual Basic
Postsecondary Credential	ITCC - TC Software Development (11.0101) VU-EC - CG Information Technology (11.0103) PFW – Certificate Computer Information Systems (11.0101)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, COMM 101: Fundamentals of Public Speaking, IVYT 115: Student Success in Computing and Informatics, MATH 136+ College Algebra or Higher VU - ENGL 101: English Composition I, ENGL 102: English Composition II, MATH 103: Quantitative Reasoning
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Software Development***
7184.D1.1	Distinguish between systems software and application software.
7184.D1.2	Compare and utilize compilers, interpreters and code generators.
7184.D1.3	Describe and explain the use of variables, constants and data types used in programming.
7184.D1.4	Identify and use control structures.
7184.D1.5	Understand the fundamentals of programming using Object Oriented Programming Concepts.
7184.D1.6	Learn to use a current industry standard IDE.
7184.D1.7	Demonstrate the ability to pseudocode and use design logic for applications requiring end-user input.
7184.D1.8	Understand assignment operators, variables, string, and arithmetic operations.
7184.D1.9	Demonstrate the use of conditionals to logically program applications per provided specifications.
7184.D1.10	Explain abstraction, modularization, functions and parameter passing in programming.
7184.D1.11	Write, perform use-case testing, debug and document programs in an integrated development environment.
7184.D1.12	Develop competence in the techniques of systematic problem analysis, algorithm development, program construction and documentation.
7184.D1.13	Apply the phases and design concepts of software development life cycle (SDLC), including version controls.
7184.D1.14	Gain an understanding of the basic concepts of best practice user-interface design.

7184.D1.15	Understand industry-standard software engineering tools.
7184.D1.16	Understand social, legal and ethical issues in software engineering.
7184.D1.17	Examine basic concepts related to secure programming.
7184.D1.18	Examine the use of software repositories and collaboration tools in software development.

Software Development Capstone		
Career Cluster	Digital Technology	
Program of Study	Software Development	
NLPS Sequence	D	
Course Code	7253	
Course Description	*Software Development Capstone provides a basic understanding of the fundamental concepts involved when using an object oriented programming language. The emphasis is on logical program design using a modular approach involving task-oriented program functions. Object-oriented concepts such as methods, attributes, inheritance, exception handling, and polymorphism are utilized. Applications are developed using these concepts and include developing a graphical user interface, selecting forms and controls, assigning properties and writing code. Students will also build upon their web design experiences in previous courses by taking an in-depth look into client- and server-side scripting aspects including Java Script and PHP: hypertext preprocessor along with other scripting tools.*	
Prerequisite(s)/ Corequisite(s)	Principles of Computing; Website and Database Development; Software Development	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Business Education 7-12	
Rules 46-47	● Business Education 9-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist: Business IT: Programming & Software Development 9-12	
Rules 2002	● Business with high school setting ● Computer Education with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business IT: Programming & Software Development & Network Systems	
REPA/REPA 3	● Computer Education 5-12, P-12	

	● Computer Science 5-12, P-12 ● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist: Computer Science 9-12 ● Workplace Specialist: Networking 9-12 ● Workplace Specialist: Info Technology: Program & Software Development 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	SDEV 250: Client-Side Scripting Languages and Tools; SDEV 253: Server-Side Scripting Languages and Tools*; SDEV 200: Software Development using Java; SDEV 210: Software Development using Visual Basic in the .NET Framework; SDEV 220: Software Development Using Python; SDEV 230: Software Development using C++, SDEV 240: Software Development Using C#
VU Course Alignment	COMP 257: Advanced Web Page Design VU-EC – CNET 151: Information and Data Security I ; COMP 275: Mobile Application Development
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Software Development (11.0101) VU - CG Information Technology (11.0103)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, COMM 101: Fundamentals of Public Speaking, IVYT 115: Student Success in Computing and Informatics, MATH 136+ College Algebra or Higher VU: ENGL 101: English Composition I, ENGL 102: English Composition II, MATH 103: Quantitative Reasoning
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Software Development Using Java***
7253.D1.1	Identify key concepts of object-oriented programming.
7253.D1.2	Program in Java-based classes, objects, and inheritance.
7253.D1.3	Create applets for Web applications.
7253.D1.4	Create applications for working with Web databases.
7253.D1.5	Understand the design and implementation of classes using inheritance and polymorphism.
7253.D1.6	Understand the use and implementation of interfaces.
7253.D1.7	Understand how to handle user and coding errors using expressions.
7253.D1.8	Understand and work with the implementation of Linked List data structures.
7253.D1.9	Be familiar with the Stack and Queue data structures.
7253.D1.10	Be exposed to the Java Collections interface.
Domain	***Software Development using Visual Basic in the .Net Framework***
7253.D2.1	Apply the Visual Studio Integrated development environment (IDE) functionality to create console, desktop, and web based (ASPX) software applications.
7253.D2.2	Explain the philosophy, structure, and foundations of the .NET framework.

7253.D2.3	Describe and create applications using factoring and object-oriented programming (OOP) concepts.
7253.D2.4	Implement projects that interact with Windows functionality.
7253.D2.5	Apply programming structures, data types, naming, and best practice concepts.
7253.D2.6	Apply methods and techniques to find (debug), prevent errors, and trap exceptions in projects.
7253.D2.7	Implement Visual Basic projects using various control objects in desktop and web-based projects.
7253.D2.8	Implement collection objects including arrays in projects.
7253.D2.9	Apply programming objects that interact with files, file systems, and the network.
7253.D2.10	Create projects that interact with databases objects including the LINQ class.
7253.D2.11	Implement projects using graphics and multimedia.
Domain	***Software Development Using Python***
7253.D3.1	Create programs using the basic structure of the Python language including variables, constants and character strings, arithmetic operators, expressions and control statements.
7253.D3.2	Create programs using Python-based classes, objects, and inheritance
7253.D3.3	Use functions in programs
7253.D3.4	Use lists, tuples, dictionaries and sets in programs.
7253.D3.5	Use searching, sorting, and complexity analysis in programs.
7253.D3.6	Evaluate the importance of using tools for design, documentation, and testing.
7253.D3.7	Demonstrate how to utilize collections, arrays, and linked structures such as stacks, queues, and lists.
7253.D3.8	Create applications using recursive functions.
7253.D3.9	Evaluate, test and debug Python programs.
7253.D3.10	Create applications using GUI Programming.
7253.D3.11	Discuss Linked lists, stacks, queues, binary search trees.
Domain	***Software Development Using C++***
7253.D4.1	Design programs utilizing class and data abstraction.
7253.D4.2	Understand and use the basic programming constructs of C++.
7253.D4.3	Describe the various classifications of I/O streams.
7253.D4.4	Manipulate various C++ datatypes, such as arrays, strings, and pointers.
7253.D4.5	Describe and utilize C++ searching and sorting techniques.
7253.D4.6	Isolate and fix common errors in C++ programs.
7253.D4.7	Demonstrate an understanding and proper use of exception handling and recursive functions.
7253.D4.8	Use memory appropriately, including proper allocation/deallocation procedures.
7253.D4.9	Apply object-oriented approaches to software problems in C++.
7253.D4.10	Demonstrate an understanding of linked lists, stacks, and queues.
7253.D4.11	Design programs showing an understanding of inheritance and composition.
7253.D4.12	Design, code, edit, compile, test, and debug advanced level C++ language programs or Software Design Using C#.
7253.D4.13	Construct proper C# programming statements correctly using variables, constants, character strings, arithmetic operators, expressions, and statements.
7253.D4.14	Use control structures and methods in programs.
7253.D4.15	Design and implement user defined methods for satisfying stated programming objectives.
7253.D4.16	Apply the use of variable pointers and array processing.
7253.D4.17	Create and access data files using sequential and random-access operation techniques.

7253.D4.18	Demonstrate how to create and utilize user defined data structures.
7253.D4.19	Demonstrate and use multi-dimensional arrays, array lists, queues, stacks, and other collection classes.
7253.D4.20	Design programs utilizing class and object definitions.
7253.D4.21	Utilize various I/O functions for performing random access file operations.
7253.D4.22	Set up and use the concepts of inheritance and polymorphism in an object-oriented program.
7253.D4.23	Demonstrate the use of exception handling.
7253.D4.24	Design, code, edit, compile, test, and debug C# language programs.
Domain	***Advanced Web Page Design***
7253.D5.1	Demonstrate the ability to develop advanced Cascading Style Sheets
7253.D5.2	Understand how to insert multimedia components into a Web page
7253.D5.3	Create dynamic Web pages and add functionality using JavaScript and the Document Object Model
7253.D5.4	Demonstrate the ability to validate Web forms
7253.D5.5	Understand the purpose and use of XML documents
Domain	***Client-Side Scripting Languages***
7253.D6.1	Understand the differences in the capabilities of a client-side scripting language and a server-side scripting language.
7253.D6.2	Understand the importance of Mobile First, responsive Web design (RWD), and progressive enhancement (PE) using the latest HTML standards and semantic elements.
7253.D6.3	Use the Document Object Model (DOM) to map and manipulate an HTML document.
7253.D6.4	Understand and explain the synchronous behavior of HTTP requests.
7253.D6.5	Understand and explain the use of Asynchronous JavaScript and XML (AJAX) as it is used to update part of a Web page without requiring a new HTTP request (page refresh).
7253.D6.6	Understand and demonstrate the different uses for GET and POST requests and queries.

Education

Exploring Education Professions		
Career Cluster	Education and Training	
Program of Study		
NLPS Sequence	Introductory	
Course Code	5415	
Course Description	*Exploring Education Professions is for those students interested in a career in (or exploring possibilities in) education. This course is an introduction to the education field and does not have prerequisites. Exploring Education Professions includes the history of education, an introduction to education professions, qualities and responsibilities of effective teachers, and student evaluation of aptitudes. The course will include epxloration of the early childhood, elementary, and secondary fields. A project-based approach that utilizes higher order thinking, communication, leadership, management, and fundamentals to college and career success is recommended. Direct, concrete mathematics and language arts proficiencies will be applied. Service learning, introductory laboratory/field experiences in a variety of education settings, and other authentic applications are strongly recommended. This course provides a foundation for continuing and post-secondary education in all career areas related to children, child development, and nurturing of children.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 or 2 semester course, 1 credit per semester, 2 credits max	
Counts Toward		
Dual Credit Status		
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma **Note**: This course qualifies for funding at the 8th grade level	
ADDITIONAL COURSE INFO		
Funding	Introductory	Available for 8th grade
Bulletin 400	● Any valid teaching license with proof of 5 years teaching experience	
Rules 46-47	● Any valid teaching license with proof of 5 years teaching experience	
Rules 2002	● Any valid teaching license with proof of 5 years teaching experience	
REPA/REPA 3	● Any valid teaching license with proof of 5 years teaching experience	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		

VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
5415.D4.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
5415.D4.2	Explain the benefits and responsibilities of being a member of a CTSO.
5415.D4.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5415.D4.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
5415.D5.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
5415.D5.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster
5415.D5.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
5415.D5.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society
5415.D5.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest
5415.D5.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
5415.D5.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster
Domain	***Foundations of Education***
5415.D1.1	Identify significant events in the history of U.S. public education.
5415.D1.2	Assess the impact of important cultural and social events on the evolution of the U.S. education system. Examples of events include but are not limited to the establishment of the first public school, major U.S. Supreme Court cases (*Brown v. Board*), the Vocational

	Rehabilitation Act, desegregation, Title IX, and No Child Left Behind, Civil Rights Act, the development of the internet and virtual instruction, use of technology in classrooms, COVID-19, and the importance of early learning (birth – age 5).
5415.D1.3	Research and summarize in a clear and coherent narrative, the influences of major educational theorists' philosophies.
5415.D1.4	Evaluate the validity theories by assessing the extent to which the reasoning and evidence of each theorist support their claims. Examples of theorists include but are not limited to John Dewey, Maria Montessori, Benjamin Bloom, Jean Piaget, Lev Vygotsky, Loris Malaguzzi.
Domain	***Educator Responsibilities***
5415.D2.1	Through a pre-recorded lesson, in-class presentation, or interview of professionals in the education field, gather information about their roles and responsibilities.
5415.D2.2	Categorize the range of tasks that different educators are responsible for and estimate the time spent on each one.
5415.D2.3	Explore multiple facets of common teaching activities such as planning effective instruction, facilitating instruction by using multiple teaching methods, assessing student learning, non-instruction tasks (e.g. parent communication, building activities, etc.).
5415.D2.4	Describe the aptitudes, including 21st century skills, needed by education professionals.
5415.D2.5	Self-assess 21st century skills including the ability to communicate verbally and nonverbally in a respectful manner, work effectively in teams and resolve conflicts, when necessary, demonstrate a positive work ethic, understand different cultural perspectives and their impact in the classroom, use technology, adapt to changes, manage time wisely.
5415.D2.6	Using the 21st century skills self-assessment, establish a baseline evaluation of 21st century skills, attitudes, and work habits. Create a growth plan promoting advancement of skills and abilities.
Domain	***Project-based Learning***
5415.D3.1	Through a pre-recorded or live class, observe a teacher in an early childhood, elementary, and secondary setting.
5415.D3.2	As a course culmination, create a project to illustrate a preferred education career.

Education and Training: Special Topics	
Career Cluster	Education and Training
Program of Study	
NLPS Sequence	
Course Code	5976
Course Description	*Education and Training: Special Topics is an extended learning experience designed to address the advancement and specialization of careers within the career cluster through the provision of a specialized course for a specific workforce need in the school's region. The learning experience is at a qualified site, and is designed to give the student the opportunity to practice*

	technical skills previously learned in the classroom while working under the direction of the appropriately licensed professional. Throughout the course, students will focus on learning about employment opportunities at a variety of entry levels, an overview of the career cluster, teams, and legal and ethical considerations; and obtaining the knowledge, skills and attitudes essential for success in specific occupations. Course standards and curriculum must be tailored to the specific profession, preparing students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. This course also provides students with the knowledge, attitudes, and skills needed to make the transition from high school, to postsecondary opportunities, and to work in a variety of careers. Students are encouraged to focus on self-analysis to aid in their career selection. Job seeking and job maintenance skills, personal management skills, and completion of the application process for admission into a postsecondary program are also areas of focus. Participation in a related CTSO encourages the development of leadership, communication and career related skills, and opportunities for community service.
Prerequisite(s)/ Corequisite(s)	None Recommended: CTE courses that would help prepare the student for success in this area
Credits	1 semester course, up to 3 credits per semester, may be offered for successive semesters up to 12 credits
Counts Toward	
Dual Credit Status	X
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE funding
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Appropriate Vocational License ● Vocational Home Economics K-12 ● Any valid teaching license with proof of 5 years teaching experience
Rules 46-47	● Appropriate Vocational License ● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Any valid teaching license with proof of 5 years teaching experience
Rules 2002	● Appropriate CTE License ● CTE: Family & Consumer Sciences with high school setting ● Any valid teaching license with proof of 5 years teaching experience
REPA/REPA 3	● Appropriate CTE License ● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Education Professions 9-12 ● Any valid teaching license with proof of 5 years teaching experience
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	

VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	

Advanced Career & Technical Education, College Credit: Education and Training		
Career Cluster	Education and Training	
Program of Study		
NLPS Sequence		
Course Code	6140	
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited postsecondary institution through an adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint program of study involving a postsecondary partnership.*	
Prerequisite(s)/ Corequisite(s)	None Recommended: CTE courses that would help prepare the student for success in this area	
Credits	1 semester course, up to 3 credits per semester, may be offered for successive semesters up to 12 credits	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE funding.	
ADDITIONAL COURSE INFO		
Funding	Pilot	
Bulletin 400	● Vocational Home Economics K-12	

	● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Early Childhood Education and Services ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Early Childhood Education and Services 9-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	

Education Early Childhood Education							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7160	Principles of Early Childhood Education	7158	Early Childhood Education Curriculum	7159	Early Childhood Education Guidance	7259	Early Childhood Education Capstone

Principles of Early Childhood Education		
Career Cluster	Education	
Program of Study	Early Childhood	
NLPS Sequence	A	
Course Code	7160	
Course Description	*This course provides students with an overview of skills and strategies necessary to successfully complete a certificate. Additionally, it provides an overview of the history, theory, and foundations of early childhood education as well as exposure to types of programs, curricula and services available to young children. This course also examines basic principles of child development, Developmentally Appropriate Practices (DAP), importance of family, licensing, and elements of quality care of young children with an emphasis on the learning environment related to health, safety, and nutrition. Students may be required to complete observations and field experiences with children as part of this course.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience	

Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Early Childhood Education and Services ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Early Childhood Education and Services 9-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ECED 100: Introduction to Early Childhood Education; ECED 101: Health, Safety, and Nutrition
VU Course Alignment	EDUC 260: Childhood Health, Safety, and Nutrition
Four Yr. Course Alignment	PNW - EDST 27000: Early Childhood Education BSU – ECYF 100: Introduction to Early Childhood, Youth, and Family Studies ISU – ELED 100: Foundations of Early Childhood Education
Postsecondary Credential	ITCC - CT Early Childhood Ed: CDA Process, TC Early Childhood Education (13.1210) BSU - B.A./B.S. Early Childhood Education (13.1210) ISU - B.A./B.S. in Early Childhood Education (13.1210) VU - A.S. Education - Early Childhood Concentration (13.1210)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University Transition, PSYC 101: Introduction to Psychology or SOCI 111: Introduction to Sociology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Early Childhood***
7160.D1.1	Recognize the value of developing positive communication strategies and establishing beneficial relationships within an early childhood facility.
7160.D1.2	Implement skills to build positive relationships with families.
7160.D1.3	Study the history, theories, and foundations of early childhood education
7160.D1.4	Recognize and explore various curriculums and settings for early childhood education programs.
7160.D1.5	Identify effective, quality programs for young children in various settings.
7160.D1.6	Identify and organize resources within the community to enhance family wellbeing.
7160.D1.7	Evaluate present and determine future professional goals while exploring opportunities in the field of early childhood, advocacy, organizations, and resources.
7160.D1.8	Identify and practice appreciation for diversity.
7160.D1.9	Identify and practice various observation/recording methods.
7160.D1.10	Explore the role of technology in programs for young children.
7160.D1.11	Examine the NAEYC Code of Ethics, CDA, NAEYC Accreditation standards, state licensing regulations, and membership in professional organizations.

7160.D1.12	Complete Indiana ILEAD webinar trainings for Child Abuse Prevention and Detection, and Health and Safety Modules 1.4.
7160.D1.13	Begin their own Professional Program Portfolio based on local campus guidelines (contact local program chair for instructions).
Domain	***Health, Safety, and Nutrition***
7160.D2.1	Describe and discuss the physical, cognitive, social, emotional, and creative developmental domains of the young child from infancy through eight years of age.
7160.D2.2	Discuss Developmentally Appropriate Practice (DAP) in terms of chronological age and developmental levels in terms of appropriateness of activities and environments for children from infancy through eight years of age.
7160.D2.3	Describe, discuss, and practice observation skills, and assess safe and healthy practices.
7160.D2.4	Describe and discuss developmentally appropriate guidance practices.
7160.D2.5	Describe and recognize the importance of the child's family and its role as the child's first teacher in enhancing safe and healthy learning.
7160.D2.6	Identify primary elements of Indiana's licensing requirements for early care and education.
7160.D2.7	Demonstrate cooperation through group creation and presentation of a health and safety educational experience.
7160.D2.8	Identify and discuss quality care issues relating to safety and health, safety, and nutritional components essential for providing quality care including routines, daily schedule, and the physical arrangement of the indoor and outdoor play areas.
7160.D2.9	Identify, describe, and discuss stressors and potential stressors that may affect children, families and early care and education teachers.
Domain	***Career Navigation***
7160.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7160.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7160.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7160.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7160.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7160.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7160.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7160.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7160.D5.1	Demonstrate computer literacy skills and basic computer functions.
7160.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7160.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant

	math and data knowledge.
7160.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Early Childhood Education Curriculum		
Career Cluster	Education	
Program of Study	Early Childhood	
NLPS Sequence	B	
Course Code	7158	
Course Description	*Early Childhood Education Curriculum examines developmentally appropriate environments and activities in various childcare settings while exploring the varying developmental levels and cultural backgrounds of children. Students may be required to complete observations and field experiences with children as related to this course.*	
Prerequisite(s)/ Corequisite(s)	Principles of Early Childhood Education	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Early Childhood Education and Services ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Early Childhood Education and Services 9-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	ECED 103: Curriculum in the Early Childhood Classroom; ECED 104: Supportive Interactions and Behavior Guidance
VU Course Alignment	
Four Yr. Course Alignment	BSU - ECYF 252: Creative Experiences for Young Children ISU – ELED 220: Integrated Curriculum for Young Children
Postsecondary Credential	ITCC - CT Early Childhood Ed: CDA Process (13.1210), TC Early Childhood Education (13.1210) BSU - B.A./B.S. Early Childhood Education (13.1210) VU - A.S. Education - Early Childhood Concentration (13.1210) ISU - B.A./B.S. in Early Childhood Education (13.1210)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University Transition, PSYC 101: Introduction to Psychology or SOCI 111: Introduction to Sociology
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Early Childhood Curriculum***
7158.D1.1	Describe and discuss Developmentally Appropriate Practice as it pertains to the young child from infancy through eight years of age with an emphasis on the importance of healthy and respectful relationships between adults, children, and families in the early learning setting.
7158.D1.2	Recognize and describe the ways young children develop in the physical, communication, arts, inquiry, social, and self-awareness domains.
7158.D1.3	Recognize and discuss inappropriate teaching methods for young children.
7158.D1.4	Research current curriculum models in use in early childhood education.
7158.D1.5	Describe, discuss, and evaluate Developmentally Appropriate environments that promote the young child's healthy development.
7158.D1.6	Demonstrate observation skills to evaluate an early learning setting and develop a plan to enhance the environment for all children, including those with special needs.
7158.D1.7	Demonstrate the ability to access and utilize the Indiana Early Learning Foundations to plan meaningful curriculum for young children.
7158.D1.8	Describe and discuss Bloom's Taxonomy and its relationship to planning developmentally appropriate activities for young children.
7158.D1.9	Create Developmentally Appropriate Activity (Lesson) Plans that promote the young child's development in the physical, communication, arts, inquiry, social, and self-awareness domains.
7158.D1.10	Incorporate Developmentally Appropriate Activity (Lesson) Plans into an Integrated Curriculum Study appropriate for use in the infant/toddler, preschool, or school-age classroom.
7158.D1.11	Complete Indiana ILEAD webinar training for Introduction to the Indiana Early Learning Foundations.
7158.D2.1	Recognize Indiana's Foundations for Birth to age 5 and Indiana Academic standards for kindergarten through 3rd grade.
Domain	***Behavior Guidance***

7158.D3.1	Demonstrate effective communication strategies and skills to build positive relationships with children, coworkers, and families. (2b, 4a, 6a)
7158.D3.2	Understand and demonstrate positive, caring, supportive relationships and interactions as the foundation of early childhood educators' work with children birth-age 8. (4a)
7158.D3.3	Examine current research on working with children and families who have experienced trauma. (1b, 1c)
7158.D3.4	Identify signs of abuse and neglect and know guidelines for reporting suspected child abuse or neglect. (6b)
7158.D3.5	Identify strategies that model respect for diversity, equity, inclusion, and belonging. (2a)
7158.D3.6	Examine various theories, philosophies, and strategies to support positive guidance techniques for young children. (1a, 1b, 1c, 4b)
7158.D3.7	Demonstrate developmentally appropriate environments, expectations, routines, and behavior guidance strategies. (1b, 1c, 4b)
7158.D3.8	Observe and document children's behaviors. (1b, 1c, 3c)
7158.D3.9	Understand behavior guidance plan processes for individual children. (1b, 1c, 1d, 3d)
7158.D3.10	Know about various community resources available to support children, families, and teachers. (2a, 2c)

Early Childhood Education Guidance		
Career Cluster	Education	
Program of Study	Early Childhood	
NLPS Sequence	C	
Course Code	7159	
Course Description	*This course allows students to analyze developmentally appropriate guidance, theory and implementation for various early care and education settings. It also provides a basic understanding of the anti-bias/multicultural emphasis in the field of early childhood. Students may be required to complete observations and field experiences with children as part of this course.*	
Prerequisite(s)/ Corequisite(s)	Principles of Early Childhood Education; Early Childhood Curriculum	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience	

Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Early Childhood Education and Services ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Early Childhood Education and Services 9-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ECED 130: Developmentally Appropriate Guidance in a Cultural Context; ECED 120: Child Growth and Development
VU Course Alignment	
Four Yr. Course Alignment	BSU – ECYF 210: Promoting Prosocial Behavior in Young Children: Guidance and Cultural Factors
Postsecondary Credential	ITCC - CT Early Childhood Ed: CDA Process (13.1210), TC Early Childhood Education (13.1210) BSU – B.A./B.S. Early Childhood Education (13.1210)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University Transition, PSYC 101: Introduction to Psychology or SOCI 111: Introduction to Sociology
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Early Childhood Guidance***
7159.D1.1	Identify, define, and evaluate developmentally appropriate practices in early childhood multicultural curriculum in terms of gender, culture and ability.
7159.D1.2	Describe the social foundations and theory of anti-bias issues in the early childhood profession.
7159.D1.3	Examine multicultural issues in the early childhood field including guidance, basic routines, communication, play and socialization.
7159.D1.4	Obtain and use resources for an anti-bias curriculum.
7159.D1.5	Design anti-bias activities for young children and implement activities in an early care setting.
7159.D1.6	Define and demonstrate positive child guidance strategies and the influence of culture on behavior.
7159.D1.7	Design an environment conducive to both short term and long-term goals in relation to individual needs.
7159.D1.8	Identify the elements of prosocial behavior and develop culturally sensitive strategies for

	individual children in the early childhood setting.
7159.D1.9	Identify and evaluate how personal biases impact effective interactions between children and their families and assessments of young children.
7159.D1.10	Observe, practice and critique positive guidance techniques, which are culturally sensitive and consider the needs of individual children.
Domain	***Child Growth and Development***
7159.D2.1	Identify and define the sequence and process underlying physical, cognitive, social, emotional, and moral characteristics and needs of development from conception to twelve years.
7159.D2.2	Recognize the impact of culture and society on the child's development including support systems in various countries.
7159.D2.3	Identify and explore ways to support children in their growth and development process related to early brain development, learning, self-concept, and their relationship with others.
7159.D2.4	Identify the content knowledge of major theories of early child growth and development and the strengths and challenges of each.
7159.D2.5	Identify and discuss appropriate environments that promote healthy development of children from a variety of cultural and ethnic backgrounds.
7159.D2.6	Review and critique topical literature and other professional resources in early childhood education, to integrate knowledgeable, critical and reflective perspective.
7159.D2.7	Survey observational methods used by early care and educational professionals.
7159.D2.8	Conduct a research project related to child development utilizing common information gathering methods.

Early Childhood Education Capstone	
Career Cluster	Education
Program of Study	Early Childhood
NLPS Sequence	D
Course Code	7259
Course Description	*This course will prepare students to complete the application, CDA exam, and verification process for the Child Development Associate (CDA) credential. Students may also study the physical, social, emotional, cognitive, and moral development of children from conception to age twelve. Theories of child development, biological and environmental foundations, prenatal development, the birth process, and the newborn baby will be discussed. Additionally, students will explore the aspects of early literacy skill development in young children from birth through third grade. Students will explore techniques, technological tools and other learning opportunities that encourage positive attitudes in children regarding listening, speaking, reading and writing activities. In the course, students will research, examine and explore the use of observation in screening and assessment to promote healthy literacy development in early childhood education. Finally, students will be provided an introduction to caring for each exceptional child. This includes theories and practices for producing optimal developmental growth. Students may be required to complete observations and field experiences with children as part of this course.*
Prerequisite(s)/	Principles of Early Childhood Education; Early Childhood Curriculum; Early Childhood

Corequisite(s)	Guidance	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Vocational Home Economics K-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Early Childhood Education and Services ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Early Childhood Education and Services 9-12 ● A teacher with an Elementary, Early Childhood or Psychology license with proof of 5 years teaching experience	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	ECED 105: CDA Process; ECED 234: Literacy in the Early Child Classroom	
VU Course Alignment		
Four Yr. Course Alignment	BSU - EDPS 260: Growth and Development for Elementary Education, EDPS 254: Psychology of Early Childhood	
Postsecondary Credential	ITCC - CT Early Childhood Ed: CDA Process (19.0706), TC Early Childhood Education (13.1210) BSU – B.A./B.S. Early Childhood Education (13.1210)	
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University Transition, PSYC 101: Introduction to Psychology or SOCI 111: Introduction to Sociology	
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Child Development Associate (CDA) Process***	

7259.D1.1	Prepare and implement activities and experiences for physical, cognitive, and creative and affective development within the context of the whole child.
7259.D1.2	Practice standards of the settings.
7259.D1.3	Evaluate activities and experiences in the early childhood setting.
7259.D1.4	Support positive self-concept in self, children, families, and staff.
7259.D1.5	Demonstrate pro-social and professional behavior.
7259.D1.6	Select activities and techniques that promote individual skills.
7259.D1.7	Synthesize prior knowledge to exhibit skills in the CDA competencies.
7259.D1.8	Recognize specific behaviors in children related to the CDA competencies.
7259.D1.9	Demonstrate mastery of communication competence in accordance with professional early childhood practices.
7259.D1.10	Demonstrate safe and healthy standards of the setting.
7259.D1.11	Demonstrate appropriate environments for the setting.
7259.D1.12	Successfully complete applications for a Child Development Associate (CDA) to the Council for Professional Recognition in Washington DC.
Domain	***Literacy in the Early Child Classroom***
7259.D2.1	Identify and define the emergence of speech and auditory skills in children, birth through third grade and the role of vocabulary development and vocabulary knowledge in oral and written language comprehension.
7259.D2.2	Explore cultural influences in language and literacy development in children.
7259.D2.3	Recognize and evaluate the aspects of the learning environment including appropriate instructional and adaptive technology that support the emergence of literacy development in children.
7259.D2.4	Select, evaluate, and share developmentally appropriate literature for young children and know considerations for the different types and purposes of texts, with emphasis on the role of decodable texts in teaching beginning readers.
7259.D2.5	Explore the five pillars of the Science of Reading.
7259.D2.6	Understand the (5) language processing requirements of proficient reading and writing: phonological, orthographic, semantic, syntactic, discourse.
7259.D2.7	Understand rationale for and identify all the consonant phonemes and all the vowel phonemes of English.
7259.D2.8	Develop activities that support families in providing emerging literacy activities for the home.
7259.D2.9	Identify the goals, benefits and uses of assessments, including observation and screenings when planning language arts activities for young children and know well-validated screening tests designed to identify students at risk for reading difficulties as well as informal diagnostic surveys of phonological and phoneme awareness, decoding skills, oral reading fluency, comprehension, spelling, and writing.
7259.D2.10	Know phases in the typical developmental progression of oral language, phoneme awareness, decoding skills, printed word recognition, spelling, reading fluency, reading comprehension, and written expression.
7259.D2.11	Understand in practice considerations for levels of phonological sensitivity, phonemic awareness difficulties, specific goals of phonemic-awareness instruction and considerations for the principles of phonemic-awareness instruction: brief, multisensory, conceptual, articulatory, auditory-verbal.
7259.D2.12	Know in practice considerations for the structure of English orthography and the patterns and rules that inform the teaching of single- and multisyllabic regular word reading, systematically,

	cumulatively, and explicitly teaching basic decoding and spelling skills, and organizing word recognition and spelling lessons by following a structured phonics lesson plan.
7259.D2.13	Know in practice considerations for the role of fluent word-level skills in automatic word reading, oral reading fluency, reading comprehension, and motivation to read and considerations for the use of explicit comprehension strategy instruction, as supported by research.
7259.D2.14	List and explain the developmental phases of the writing process and understand the major skill domains that contribute to written expression including knowledge of foundational gross motor, fine motor, proprioceptive and vestibular development necessary for pre-writing, considerations for research-based principles for teaching letter formation in manuscript, considerations for research-based principles for teaching written spelling and punctuation.
7259.D2.15	Identify, observe, and evaluate the developmental stages of writing and Concepts of Print in young children.
7259.D2.16	Plan, implement, and evaluate activities and experiences to promote emergent literacy in alignment with Science of Reading and Indiana Early Learning Standards and Indiana Academic Standards for Language Arts K-3, and understand the general principles and practices of structured language and literacy teaching, including explicit, systematic, cumulative, teacher-directed instruction.
7259.D2.17	Complete a minimum of 16 hours of lab experience and 16 hours of field experience with school age K-3; which includes 8 hours for preparation/planning (including creation of materials)/observation, 4 hours for implementation/assessment/working directly with children, and 4 hours for reflection, evaluation and professional communication with the site mentor/cooperating teacher.

Education Education Professions							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7161	Principles of Teaching	7157	Child and Adolescent Development	7162	Teaching and Learning	7267	Education Professions Capstone

Principles of Teaching		
Career Cluster	Education	
Program of Study	Education Professions	
NLPS Sequence	A	
Course Code	7161	
Course Description	*This course provides a general introduction to the field of teaching. Students will explore educational careers, teaching preparation, and professional expectations as well as requirements for teacher certification. Current trends and issues in education will be examined.* ***A minimum 20 hour classroom observation experience is required for successful completion of this course****.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Vocational Home Economics K-12 ● Any valid teaching license with proof of 5 years teaching experience	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Any valid teaching license with proof of 5 years teaching experience	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Any valid teaching license with proof of 5 years teaching experience	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Education Professions 9-12 ● Any valid teaching license with proof of 5 years teaching experience	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	EDUC 101: Introduction to Teaching
VU Course Alignment	
Four Yr. Course Alignment	IUB - EDUC F200: Examining Self as Teacher PFW - EDU 20000: Examining Self as Teacher PNW – EDST 20000: History and Philosphy of Education ISU - EDUC 200: Best Practices in Teaching BSU - EDEL 100: Education in a Democratic Society, EDSE 150: Basic Concepts of Secondary Education
Postsecondary Credential	ITCC - TC Elementary Education (13.1501) ISU – B.S. Elementary Education (13.1202) IUB – B.S. Elementary Education (13.1202), B.S. Secondary Education (13.1205) PFW – B.S.Ed. Elementary Education (13.1202) PNW – B.A. in Elementary Education (13.1210/13.1202) BSU - B.A./B.S. Exceptional Needs: Early Childhood Special Education (13.1015), B.A./B.S. Elementary Education (13.1202)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University Transition, PSYC 101: Introduction to Psychology or SOCI 111: Introduction to Sociology
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Teaching***
7161.D1.1	Identify and appreciate the essential qualifications and personal demands of teaching as a profession.
7161.D1.2	Define and evaluate his/her own teaching dispositions and learning style.
7161.D1.3	Recognize the essential function of professional ethics, personal morals, and a strong value system in the role of the teacher, including the importance of confidentiality and liability issues pertaining to family/school relationships.
7161.D1.4	Reflect on personal reasons for entering the teaching profession and write an initial statement of educational philosophy.
7161.D1.5	Review current teacher licensure laws in the State of Indiana. Compare this licensure process with requirements for teaching in a variety of global locations.
7161.D1.6	Recognize and identify strategies to support the family's role as the child's first teacher and to support the family/teacher partnership in a culturally competent manner.
7161.D1.7	Identify career choices within the field of education, including opportunities to teach abroad. Explore programs for professional preparation.
7161.D1.9	Define and describe the nature, purpose, and responsibilities of the public education system in a democratic society. Compare and contrast with the role of public education in other countries.
7161.D1.10	Review the history of American education and identify the philosophical foundations of

	education and their global roots.
7161.D1.11	Identify and observe in the classroom various elements of diversity that affect K-12 student learning and accomplishment.
7161.D1.12	Recognize and examine the diversity in schools in the United States and globally.
7161.D1.13	Identify and observe in the classroom the cultural, family, and environmental factors that affect students in schools.
7161.D1.14	Complete a minimum of twenty (20) hours of supervised service learning/field work experience in a classroom and reflect on the experience in relation to personal skills, dispositions, and future professional decisions.
Domain	***Teaching and Learning Concepts***
7161.D2.1	Explain how schedules, activities, routines, and transitions promote learning
7161.D2.2	Describe curriculum and instruction models
7161.D2.3	Examine ways student learning is influenced by teaching strategies.
7161.D2.4	Assess the structure of school governance
7161.D2.5	Differentiate between various types of assessments including formative, summative, traditional, and authentic.
7161.D2.6	Analyze relevant standards in instructional planning and assessment.
Domain	***Introduction to Special Education***
7161.D3.1	Explain the significance of the research and rationale for inclusive education.
7161.D3.2	Demonstrate an understanding of differentiated instruction and heterogeneous grouping to meet the needs of diverse learners.
7161.D3.3	Demonstrate an understanding of appropriate instructional materials and methods for learners with high and low incidence disabilities and the accommodations that can be made for them in inclusive settings.
Domain	***Career Navigation***
7161.D4.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7161.D4.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7161.D4.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7161.D4.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7161.D5.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7161.D5.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7161.D5.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7161.D5.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7161.D6.1	Demonstrate computer literacy skills and basic computer functions.
7161.D6.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and

	active listening in formal and informal settings.
7161.D6.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7161.D6.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Child and Adolescent Development		
Career Cluster	Education	
Program of Study	Education Professions	
NLPS Sequence	B	
Course Code	7157	
Course Description	*Child and Adolescent Development examines the physical, social, emotional, cognitive, and moral development of the child from birth through adolescence with a focus on the middle years through adolescence. Basic theories of child development, biological and environmental foundations of development, and the study of children through observation and interviewing techniques are explored. The influence of parents, peers, the school environment, culture, and the media are discussed. An observation experience up to 20 hours may be required for completion of this course. This course has been approved to be offered for dual credit. Students pursuing this course for dual credit are still required to meet the minimum prerequisites for the course and pass the course with a C or better in order for dual credit to be awarded.*	
Prerequisite(s)/ Corequisite(s)	Principles of Teaching	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Vocational Home Economics K-12 ● Any valid teaching license with proof of 5 years teaching experience	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Any valid teaching license with proof of 5 years teaching experience	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Any valid teaching license with proof of 5 years teaching experience	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Education Professions 9-12	

	● Any valid teaching license with proof of 5 years teaching experience
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	EDUC 121: Child and Adolescent Development
VU Course Alignment	
Four Yr. Course Alignment	ISU - EPSY 202: Psychology of Childhood Adolescence BSU - EDPS 250: Human Growth and Development IUB - EDUC P250: General Educational Psychology PFW – EDU 24900: Early Childhood Development PNW - EDPS 22000: Psychology of Learning
Postsecondary Credential	ITCC - TC Elementary Education (13.1501) ISU – B.A./B.S. Elementary Education (13.1202) IUB – B.S. Elementary Education (13.1202) PFW – B.S.Ed. Elementary Education (13.1202) PNW - B.A. in Elementary Education (13.1210/13.1202) BSU - B.A./B.S. Early Childhood Education (13.1210)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Child & Adolescent Development***
7157.D1.1	Explore the physical, social, emotional, cognitive, and moral development of the child from birth through adolescence.
7157.D1.2	Recognize theories of growth and development that focus on early and middle childhood through the adolescent years.
7157.D1.3	Examine and implement observation and interviewing skills as a means of understanding the child.
7157.D1.4	Discuss confidentiality when working with children/adolescents and families.
7157.D1.5	Identify prosocial and antisocial behavior. Discuss culturally appropriate behavior management techniques.
7157.D1.6	Identify environments that promote healthy social/emotional development for all children/adolescents.
7157.D1.7	Recognize appropriate personal strengths and behaviors (dispositions) for adults working with school-aged children.
7157.D1.8	Identify and analyze societal issues facing today's children/adolescents, including students with exceptional needs.
7157.D1.9	Identify and explore ways to support diverse children/adolescents in their personal growth and development related to trust, autonomy, initiative, industry, and identity (Erikson's stages).
7157.D1.10	Identify community and school resources needed to support children and families from birth

	through adolescence.
7157.D1.11	Establish instructional goals that are developmentally appropriate.

Teaching and Learning		
Career Cluster	Education	
Program of Study	Education Professions	
NLPS Sequence	C	
Course Code	7162	
Course Description	*Teaching and Learning provides students the opportunity to apply many of the concepts that they have learned throughout the Education Professions pathway. In addition to a focus on best practices, this course will provide an introduction to the role that technology plays in the modern classroom. Through hands-on experience with educational software, utility packages, and commonly used microcomputer hardware, students will analyze ways to integrate technology as a tool for instruction, evaluation, and management.*	
Prerequisite(s)/ Corequisite(s)	Principles of Teaching	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Vocational Home Economics K-12 ● Any valid teaching license with proof of 5 years teaching experience	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Any valid teaching license with proof of 5 years teaching experience	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Any valid teaching license with proof of 5 years teaching experience	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Education Professions 9-12 ● Any valid teaching license with proof of 5 years teaching experience	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	EDUC 201: Technology in Education	
VU Course Alignment		

Four Yr. Course Alignment	IUB - EDUC W200: Using Computers in Education PFW – EDU 20002: Using Computers in Education BSU – EDTE 250: Curricular Integration of Technology ISU – CIMT 272: Introduction to Classroom Computer Use
Postsecondary Credential	ITCC - TC Elementary Education (13.1501) IUB – B.S. Elementary Education (13.1202) PFW – B.S.Ed. Elementary Education (13.1202) BSU - B.A./B.S. Elementary Education (13.1202) ISU – B.A./B.S. Elementary Education (13.1202)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Teaching and Learning***
7162.D1.1	Identify classroom management strategies for the elementary and secondary classroom.
7162.D1.2	Discuss effective instructional frameworks and methods such as differentiated instruction, cooperative learning, project-based learning, and metacognitive strategies.
7162.D1.3	Determine management strategies that promote positive student behavior while engaging students in learning.
7162.D1.4	Demonstrate discussion and questioning techniques that promote critical thinking and problem solving.
7162.D1.5	Create schedules, activities, routines, and transitions that promote learning.
7162.D1.6	Evaluate student data to guide instruction.
7162.D1.7	Demonstrate an understanding of the role and responsibilities of the general educator in monitoring learner progress and collecting data from formal and informal assessments to inform instruction.
Domain	***Technology in Education***
7162.D2.1	Create instructional materials in a variety of applications, formats, and styles.
7162.D2.2	Demonstrate an understanding of technological operations and concepts for instruction.
7162.D2.3	Plan and design effective learning environments and experiences supported by technology.
7162.D2.4	Apply current research on teaching and learning with technology to the planning of appropriate and challenging instructional materials and learning environments.
7162.D2.5	Apply technology to the creation of effective assessment and evaluation strategies.
7162.D2.6	Use technology to enhance the teacher's productivity, efficiency, and professional practice.
7162.D2.7	Analyze the social, ethical, legal, and human issues surrounding the use of technology in the classroom.
7162.D2.8	Explore the availability and use of assistive technologies for students with special needs.
7162.D2.9	Analyze and utilize the standards presented in the NETS and InNTASC consortia.

Education Professions Capstone		
Career Cluster	Education	
Program of Study	Education Professions	
NLPS Sequence	D	
Course Code	7267	
Course Description	*The Education Professions Capstone provides an extended opportunity for field experience to further apply concepts that have been presented throughout the pathway. Students will also have the opportunity to explore the topics of the exceptional child and literacy development through children's literature. Students will gain a deeper understanding of inclusive teaching techniques along with policies, theories, and laws related to special education. Students interested in pursuing a career in Elementary Education are encouraged to also study the benefits of using children's literature in the classroom. This course may be further developed to include specific content for students interested in pursuing a career in secondary education. The course should include a significant classroom observation and assisting experience.*	
Prerequisite(s)/ Corequisite(s)	Principles of Teaching; Child and Adolescent Development; Teaching and Learning	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Vocational Home Economics K-12 ● Any valid teaching license with proof of 5 years teaching experience	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Any valid teaching license with proof of 5 years teaching experience	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting Any valid teaching license with proof of 5 years teaching experience	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Education Professions 9-12 ● Any valid teaching license with proof of 5 years teaching experience	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	EDUC 230: The Exceptional Child, EDUC 235: Science of Reading I	
VU Course Alignment		
Four Yr. Course	ISU - SPED 226: The Exceptional Learner in the Regular Classroom; EPSY 341: Education in a	

Alignment	Multicultural Society; ENG 280 Children's Literature BSU - EDRD 204: Literature for Children; SPCE 201: Intro to Students with Exceptional Needs IUB - EDUC K205: Introduction to Exceptional Children
Postsecondary Credential	ITCC - TC Elementary Education (13.1501) VU - A.S. Education - Elementary Concentration (13.1210); A.S. Education - Early Childhood Concentration (13.1202) BSU – B.A/B.S. Early Childhood Education (13.1210) ISU – B.A./B.S. Elementary Education (13.1202), B.A./B.S. Early Childhood Education (13.1210) IUB – B.S. Elementary Education (13.1202)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***The Exceptional Child***
7267.D1.1	Describe society's changing attitudes towards exceptional children and their families, including the influence of the media, public policy, and laws pertaining to special education.
7267.D1.2	Identify and define the categories of disabilities and eligibility criteria as stipulated in federal (IDEA) and State (Article 7) legislation.
7267.D1.3	Explain the term LRE (Least Restrictive Environment) and how this influences the services provided to school-age children with disabilities.
7267.D1.4	Identify developmental likenesses and differences in children, both those who are typically developing and those with special needs.
7267.D1.5	Research various types of disabilities and the developmental and health characteristics associated with them.
7267.D1.6	Define the aspects of the family/teacher community partnership.
7267.D1.7	Explain the IFSP (Individual Family Service Plan) and the IEP (Individual Education Program) processes and the requirements of each.
7267.D1.8	Develop techniques to work with the exceptional child and support inclusion in the typical classroom setting.
7267.D1.9	Design classroom environments to meet the needs of all children. Evaluate school playgrounds for accessibility.
7267.D1.10	Create adaptive materials to use with children enrolled in special education, including gifted/ talented programs.
7267.D1.11	Recognize developmental delays in children.
7267.D1.12	Determine and write instructional goals for children with special needs.
7267.D1.13	Describe the main goals of early intervention.
7267.D1.14	Develop techniques to collaborate with other professionals and parents regarding children with special needs.
7267.D1.15	Describe and explain the various roles and responsibilities of a special education teacher.
Domain	***Science of Reading***

7267.D2.1	Explore the importance of research for educators and the role research has in informing teaching.
7267.D2.2	Analyze historical and current practices in the teaching of reading.
7267.D2.3	Describe the process of literacy development in the young child.
7267.D2.4	Analyze the components of the science of reading, including phonemic awareness, phonics, fluency, vocabulary, and comprehension.
7267.D2.5	Explain the Simple View of Reading and articulate its appropriate use in guiding assessment and instruction.
7267.D2.6	Define and describe Structured Literacy and Language Systems: orthography, phonetics, phonology, morphology, syntax, and semantics.
7267.D2.7	Interpret the research on the role of vocabulary development and word knowledge in comprehension.
7267.D2.8	Express the benefits of reading aloud, of being read to, and reading silently. Explore methods to teach effective listening skills.
7267.D2.9	Identify methods for adapting reading and writing instruction to accommodate individual differences, including the use of assistive technology tools.
7267.D2.10	Explore the use of Multi-Tiered Support Systems (MTSS) to adapt instruction to accommodate individual learning differences.
7267.D2.11	Discuss the impact of language and dialect variation on reading fluency, comprehension, and writing development.
7267.D2.12	Examine the InTASC and CEC standards as related to teacher preparation coursework.
Domain	***Field Experience***
7267.D3.1	Design a plan for materials, furnishings, and other resources to create safe and effective instructional environments.
7267.D3.2	Plan a community/and or family school partnership event to positively influence the school environment
7267.D3.3	Apply principles and elements of effective instruction and assessment in the field experience setting.

Energy & Natural Resources

Energy & Natural Resources Energy Technology							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7203	Principles of Energy Technology	7200	Fundamentals of Electricity and Motors	7198	Electrical Power and Distribution	7268	Electrical Line Capstone
						7269	Industrial Wind Capstone
						7266	Natural Gas Capstone
						7365	Renewable Energy Alternatives

Principles of Energy Technology	
Career Cluster	Energy & Natural Resources
Program of Study	Energy Technology
NLPS Sequence	A
Course Code	7203
Course Description	*Principles of Energy Technology provides a broad understanding of the electric and natural gas utility industry and the energy generation, transmission, and distribution infrastructure, commonly called the "largest machine in the world," which forms the backbone for the industry. The course includes business models, regulations, types of energy and their conversion to useable energy such as electric power, how generated power is transmitted and distributed to the point of use, emerging technologies and the connection to careers in the energy industry. Safety instruction covers topics including; Material Safety Data Sheets (MSDS), confined space, lock out/tag out, zero energy state, hazardous materials, storage of flammable materials, storage of fuel gas and high pressure gas cylinders, portable powered tool safety, hand tool safety, record keeping, training, employer enforcement of safety regulations, and right to know.*
Prerequisite(s)/ Corequisite(s)	None
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas

Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● CTE: Trade & Industry: Energy Industry 5-12 ● Technology Education 5-12 ● Workplace Specialist: Energy Industry 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	ENRG 100: Energy Industry Fundamentals	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	TC Electric Line Technology (46.0301); TC Industrial Wind Technology (47.0399); TC Natural Gas Technology (15.0903); TC Renewable Energy Technology (15.1701)	
Liberal Arts/Sciences Requirements	MATH 122: Applied Technical Mathematics; IVYT 113: Student Success – Advanced Manufacturing Engineering and Applied Sciences	
Promoted Certifications		

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Energy Industry Fundamentals***
7203.D1.1	Demonstrate knowledge of the basic and emerging principles and concepts that impact the energy industry.
7203.D1.2	Apply compliance with procedures necessary to ensure a safe and healthy work environment.
7203.D1.3	Discuss the need for workplace safety and workplace safety training programs as covered by the OSHA 10 Hour program.
7203.D1.4	Understand electric power generation.
7203.D1.5	Understand electric power transmission.
7203.D1.6	Understand electric power distribution.

7203.D1.7	Understand natural gas transmission and distribution.
7203.D1.8	Identify and describe careers and entry requirements.
7203.D1.9	Evaluate and analyze energy 'hot topics.'
Domain	***Career Navigation***
7203.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7203.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7203.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7203.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7203.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7203.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7203.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7203.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7203.D4.1	Demonstrate computer literacy skills and basic computer functions.
7203.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7203.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7203.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Fundamentals of Electricity and Motors	
Career Cluster	Energy & Natural Resources
Program of Study	Energy Technology
NLPS Sequence	B
Course Code	7200
Course Description	*Fundamentals of Electricity and Motors will introduce students to the basic electrical laws and principles pertaining to DC and AC circuits and provide a general understanding of the common types of electric motors. Electricity topics include current, voltage, resistance, power, inductance, capacitance, and transformers. Stresses the use of standard electrical tests, electrical equipment, and troubleshooting procedures. Topics related to motors will cover motor theory, magnetism and how it affects motor rotation, motor starting components and*

	protective devices for motor circuits. Heat dissipation from a motor, motor slippage, how they are wired to obtain different speeds, and how capacitors affect a motor circuit will be included. Safety procedures and practices are emphasized.
Prerequisite(s)/ Corequisite(s)	Principles of Energy Technology
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas Counts as a quantitative reasoning course
Dual Credit Status	X (PCL/CTE)
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● CTE: Trade & Industry: Energy Industry 5-12 ● Technology Education 5-12 ● Workplace Specialist: Energy Industry 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	INDT 113: Industrial Electrical I
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	TC Electric Line Technology (46.0301); TC Industrial Wind Technology (47.0399); TC Natural Gas Technology (15.0903); TC Renewable Energy Technology (15.1701)
Liberal Arts/Sciences Requirements	MATH 122: Applied Technical Mathematics; IVYT 113: Student Success – Advanced Manufacturing Engineering and Applied Sciences
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Industrial Electrical***
7200.D1.1	Demonstrate proper safety precautions related to equipment.

7200.D1.2	Define the following terms: voltage, resistance, current amperage, direct current, alternating current, and power supply.
7200.D1.3	Identify electrical components and form a schematic diagram.
7200.D1.4	Identify types of electrical mechanical switches (SPDT, DPDT, etc.)
7200.D1.5	Use Ohm's Law to calculate voltage, current, and resistance problems.
7200.D1.6	Perform voltage, current, and resistance measurements using the proper measurement devices (both analog and digital meters).
7200.D1.7	Calculate voltage, current, and resistance in simple series, parallel, and series-parallel circuits.
7200.D1.8	Create a schematic drawing and complete single phase AC electrical service connections including meter bases and service panels.
7200.D1.9	Explain the basic principles and operation of transformers, resistors, capacitors and diodes.
7200.D1.10	Describe the concepts of both DC and AC inductance and capacitance.
7200.D1.11	Calculate values for AC and DC resistive, inductive, and capacitive components.
7200.D1.12	Assemble and test laboratory exercises including building single phase AC switched circuits, and circuits using mechanical relays.
7200.D1.13	Use meters to identify and measure results of AC and DC laboratory exercises.
7200.D1.14	Demonstrate ability to read and interpret technical documents.
7200.D1.15	Demonstrate ability to use various types of software applicable to course.
7200.D1.16	Assess readiness to take the SACA C-201 Electrical Systems I Certification exam.
Domain	***Motors and Motor Controls***
7200.D2.1	Demonstrate safe practices and procedures.
7200.D2.2	Identify motors used in commercial and residential applications.
7200.D2.3	Identify and describe methods for controlling motor speeds.
7200.D2.4	Appropriately select and install motors.
7200.D2.5	Demonstrate methods of starting motors utilized in industrial applications.
7200.D2.6	Identify various types of motor protective devices used in industry.
7200.D2.7	Analyze ladder diagrams for motor circuits.
7200.D2.8	Diagnose and troubleshoot motors.
7200.D2.9	Identify various types of three-phase motor designs and applications.
7200.D2.10	Demonstrate methods for reversing AC and DC motors.
7200.D2.11	Explain the methods for accelerating and braking motors.
7200.D2.12	Demonstrate ability to read and interpret technical documents.
7200.D2.13	Demonstrate ability to use various types of software applicable to course.
7200.D2.14	Assess readiness to take the SACA C-202 Electric Motor Control Systems 1 Certification exam.

Electrical Power Distribution	
Career Cluster	Energy & Natural Resources
Program of Study	Energy Technology
NLPS Sequence	C
Course Code	7198

Course Description	*Electrical Power Distribution is an introduction to the electrical grid and power distribution. It will cover the history of the current electrical grid and the future of the smart grid, basic electrical concepts, power generation, transmission, distribution, system operations, electrical market structures, regulation, restructuring, market dynamics, and most aspects of the electricity business. This course answers the questions of who creates the power we use, how it's distributed throughout the electrical grid, who determines the cost of electricity, and who controls the entire electrical infrastructure. Students will also study the principles and components required for the transmission and distribution of electric power.*	
Prerequisite(s)/ Corequisite(s)	Principles of Energy Technology; Fundamentals of Electricity and Motors	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas Counts as a quantitative reasoning course*	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● CTE: Trade & Industry: Energy Industry 5-12 ● Technology Education 5-12 ● Workplace Specialist: Energy Industry 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	ENRG 107: Transmission and Distribution of Electric Power; ENRG 112: Electrical Power Distribution, INDT 205: Industrial Wiring Principles, INDT 104: Fluid Power I	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	TC Electrical Line Technology (46.0301); TC Industrial Wind Technology (47.0399); TC Natural Gas Technology (15.0903); TC Renewable Energy Technology (15.1701)	
Liberal Arts/Sciences Requirements	MATH 122: Applied Technical Mathematics; IVYT 113: Student Success – Advanced Manufacturing Engineering and Applied Sciences	
Promoted		

Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Electrical Power Distribution and Transmission***
7198.D1.1	Define the various sources of power and explain how they are generated.
7198.D1.2	Explain the power grid and power delivery systems.
7198.D1.3	Describe the power line safety guideline in accordance with the American Public Power Association (APPA).
7198.D1.4	Describe single and three phase transformers.
7198.D1.5	Describe voltage regulation in power systems.
7198.D1.6	Describe the process of buying and selling of power between utility companies.
7198.D1.7	Explain how power is monitored in a power grid.
7198.D1.8	Describe cabling requirements for overhead and underground power.
7198.D1.9	Describe the various faults that can occur in overhead and underground power distribution.
7198.D1.10	Describe the operation of lightning arresters.
7198.D1.11	Understand the history of the electrical grid.
7198.D1.12	Model the basic electrical concepts such as AC and DC theory.
7198.D1.13	Differentiate electrical consumers and why they pay different rates.
7198.D1.14	Analyze power generation, both traditional and renewable models.
7198.D1.15	Identify and describe how transmission and distribution systems currently work.
7198.D1.16	Explain what the smart Grid is and compare it to the current electrical grid.
7198.D1.17	Analyze electric system operations and the importance of independent system operators.
7198.D1.18	Differentiate market participants and electrical market structures.
7198.D1.19	Explain regulations in the electrical industry.
7198.D1.20	Research the Energy Policy Act and Smart Grid Policies.
7198.D1.21	Determine how to do an interconnection agreement.
7198.D1.22	Demonstrate how to make money in the electricity business.
Domain	***Industrial Wiring Principles***
7198.D2.1	Select appropriate device, pull, and junction boxes, and calculate NEC fill values.
7198.D2.2	Lay-out and install the common conduit types used in industrial settings.
7198.D2.3	Choose proper conductors, cables, raceways, and fittings.
7198.D2.4	Read and examine industrial electrical prints and ladder diagrams.
7198.D2.5	Splice, terminate, and specify NEC appropriate wire, conductors, and cable.
7198.D2.6	Understand and apply appropriate bonding and grounding techniques.
7198.D2.7	Specify and size appropriate overcurrent devices.
7198.D2.8	Recognize the hazards of industrial electricity and the procedures employed to guard against them.
7198.D2.9	Size and install appropriate equipment for motor control centers.
7198.D2.10	Demonstrate ability to read and interpret technical documents.
7198.D2.11	Demonstrate ability to use various types of software applicable to course.
7198.D2.12	Assess readiness to take the SACA C-206 Electrical System Installation 1 Certification exam.
Domain	***Fluid Power***

7198.D3.1	Calculate and demonstrate the basic physics of fluid mechanics using Pascal's Law.
7198.D3.2	Describe function and construction of various fluid power components, including pumps, valves, cylinders, filters, heat exchangers, pressure regulators, and accumulators.
7198.D3.3	Identify fluid power symbols and interpret fluid power schematic diagrams.
7198.D3.4	Demonstrate basic fluid power plumbing.
7198.D3.5	Design elementary fluid power circuits.
7198.D3.6	Troubleshoot elementary fluid power circuits.
7198.D3.7	Demonstrate knowledge of safety procedures related to fluid power equipment.
7198.D3.8	Demonstrate ability to read and interpret technical documents.
7198.D3.9	Demonstrate ability to use various types of software applicable to course.
7198.D3.10	Assess readiness to take the SACA C-209 Pneumatic Systems 1 Certification exam.

Electrical Line Capstone		
Career Cluster	Energy & Natural Resources	
Program of Study	Energy Technology	
NLPS Sequence	D	
Course Code	7268	
Course Description	*The Electrical Line Capstone course builds upon the knowledge and skills developed in the Principles of Energy Technology, Basic Electrical and Motor Controls, and Electrical Power Distribution courses by developing advanced skills that students can apply to the field. Students enrolled in this course will participate in instruction and lab activities that covers aspects proper care of climbing tools, and the mastering of climbing wood pole structures, electrical principles required for installation, maintenance and troubleshooting of power lines, rigging gear inspection, safe rigging procedures and load control, using almost any vertical or horizontal rigging system. Upon successful completion of this course, the student will be qualified in two methods of pole top rescue.*	
Prerequisite(s)/ Corequisite(s)	Principles of Energy Technology; Fundamentals of Electricity and Motors; Electrical Power and Distribution	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12	

	● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● CTE: Trade & Industry: Energy Industry 5-12 ● Technology Education 5-12 ● Workplace Specialist: Energy Industry 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ENRG 102: Climbing*; ENRG 103: Electrical Essentials for Powerline Workers*; ENRG 109: Rigging for Line Workers*
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – TC – Electrical Line Technology (46.0303)
Liberal Arts/Sciences Requirements	MATH 122: Applied Technical Mathematics; IVYT 113: Student Success – Advanced Manufacturing Engineering and Applied Sciences
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Climbing***
7268.D1.1	Select, fit, and maintain climbing equipment.
7268.D1.2	Perform climbing functions using safe and sound judgment.
7268.D1.3	Inspect pole for unsafe conditions.
7268.D1.4	Climb in both the belted and unbelted positions.
7268.D1.5	Ascend the pole using proper climbing positions.
7268.D1.6	Execute hitchhiking and circling procedures.
7268.D1.7	Hoist tool and materials to the work position.
7268.D1.8	Perform pole type rescue and vault rescue.
7268.D1.9	Identify overhead structures, stays, hardware and conductors.
Domain	***Electrical Essentials for Powerline Workers***
7268.D2.1	Describe and demonstrate the use of protective equipment.
7268.D2.2	Utilize power formulas and ohm's law.
7268.D2.3	Calculate ac current and voltage in single and three phase circuits.
7268.D2.4	Identify and utilize proper protective grounding equipment.
7268.D2.5	Explain the grounding requirement for poles.

7268.D2.6	Explain the power grid and power delivery systems.
7268.D2.7	Explain transformer connections and 3 phase banks.
7268.D2.8	Describe the power line safety guideline in accordance with the American Public
7268.D2.9	Power Association (APPA).
7268.D2.10	Describe the various types of power cabling and their properties.
7268.D2.11	Explain OSHA rules and regulations for power line workers.
Domain	***Rigging for Line Workers***
7268.D3.1	Describe and classify the various types of wire rope and discuss the factors which influence wire rope construction.
7268.D3.2	Define the term safety factor and discuss how it relates to safe working load limits.
7268.D3.3	Discuss the factors which need to be considered when inspecting wire rope slings.
7268.D3.4	Identify the various types of end attachments and describe their application in the rigging operation.
7268.D3.5	List the five common types of fiber ropes and discuss their inherent advantages and disadvantages to the rigging operation.
7268.D3.6	Contrast the advantages and disadvantages of chain slings with those of wire rope slings.
7268.D3.7	Discuss the factors which need to be considered when inspecting chain slings.
7268.D3.8	List safety considerations necessary when utilizing wire rope, fiber rope, and chain slings.
7268.D3.9	Working with wire rope, fiber rope and chains; Explain the proper handling and care of these common rigging tools; Detail correct rope splicing and end-attachment procedures.

Industrial Wind Capstone	
Career Cluster	Energy & Natural Resources
Program of Study	Energy Technology
NLPS Sequence	D
Course Code	7269
Course Description	*The Industrial Wind Capstone course builds upon the knowledge and skills developed in the Principles of Energy Technology, Basic Electrical and Motor Controls, and Electrical Power Distribution courses by developing advanced skills that students can apply to the field. Students enrolled in this course will participate in instruction and lab activities that covers aspects of site selection, topographic map reading, meteorology, wind turbine construction, wind power system components, and wind turbine safety. This course will cover general wind turbine systems and operations including troubleshooting for the mechanical, hydraulic, and electrical systems as well as the interaction of wind turbine systems with technologies. Upon completion of this course students will be able to earn the Small Wind Installer - Level 1 (SWI1) certification.*

Prerequisite(s)/ Corequisite(s)	Principles of Energy Technology; Fundamentals of Electricity and Motors; Electrical Power and Distribution	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● CTE: Trade & Industry: Energy Industry 5-12 ● Technology Education 5-12 ● Workplace Specialist: Energy Industry 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SUST 101: Wind Power; SUST 111: Wind Turbine Mechanical Systems I*; SUST 211: Wind Turbine Mechanical Systems II*	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC – TC – Industrial Wind Technology (47.0399)	
Liberal Arts/Sciences Requirements	MATH 122: Applied Technical Mathematics; IVYT 113: Advanced Manufacturing Engineering and Applied Sciences	
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Wind Power***	
7269.D1.1	Discuss the wind energy industry (A, F, G)	
7269.D1.2	Explore key factors in industry decisions (A, D, E)	
7269.D1.3	Investigate wind park development: sites and construction (A, C, E)	
7269.D1.4	Predict short term weather conditions (D)	

7269.D1.5	Identify players and roles in wind park operations (F, H)
7269.D1.6	Explain the operation of a wind turbine (B)
7269.D1.7	Practice safe doffing and donning procedures of personal fall arrest system equipment (I)
7269.D1.8	Investigate types of towers, designs, and wind turbine safety (I, H,)
7269.D1.9	Inspect climbing and fall protection equipment (I)
7269.D1.10	Understand the importance of generator and wind electrical systems (B, C, E)
7269.D1.11	Discuss the function of gearboxes (I, E, B)
7269.D1.12	Learn how wind turbines integrate with the grid (C)
7269.D1.13	Estimate wind turbine performance (I)
7269.D1.14	Attain readiness to take the ETA Small Wind Installer - Level 1 (SWI1) [H]
Domain	***Wind Turbine Mechanical Systems***
7269.D2.1	Convert between metric and English measurement systems.
7269.D2.2	Differentiate types of bolts, nuts, fasteners, bearings, and other pieces of hardware for machinery.
7269.D2.3	Identify simple machines: lever, pulley, inclined plane, screw, wheel and axle, etc.
7269.D2.4	Explain how simple machines provide mechanical advantage.
7269.D2.5	Identify bearing components.
7269.D2.6	Describe importance of lubrication in machines.
7269.D2.7	Analyze lubricants.
7269.D2.8	Perform an oil change on a machine
7269.D2.9	Determine center of gravity.
7269.D2.10	Identify anchoring points for machinery lifting.
7269.D2.11	Inspect ropes, straps, and chains.
7269.D2.12	Perform crane hand signals.
Domain	***Advanced Wind Turbine Mechanical Systems***
7269.D3.1	Differentiate corrective, preventive, and predictive maintenance.
7269.D3.2	Describe machinery lifecycles.
7269.D3.3	Describe the importance of shaft alignment
7269.D3.4	Differentiate between shaft axes for alignment.
7269.D3.5	Perform mechanical shaft alignment.
7269.D3.6	Perform laser shaft alignment.
7269.D3.7	Explain the importance of vibration analysis.
7269.D3.8	Perform a capture of a vibration signature.
7269.D3.9	Analyze a vibration signature against a control.
7269.D3.10	Explain the purpose of temperature control on moving parts.
7269.D3.11	Apply thermodynamic laws to temperature management.
7269.D3.12	Model a wind turbine coolant system.
7269.D3.13	Troubleshoot temperature sensors.
7269.D3.14	Explain the mechanisms through which SCADA interacts with wind turbine mechanical systems.
7269.D3.15	Use SCADA software to identify wind turbine system mechanical failures.

Natural Gas Capstone		
Career Cluster	Energy & Natural Resources	
Program of Study	Energy Technology	
NLPS Sequence	D	
Course Code	7266	
Course Description	*The Natural Gas Capstone course builds upon the knowledge and skills developed in the Principles of Energy Technology, Basic Electrical and Motor Controls, and Electrical Power Distribution courses by developing advanced skills that students can apply to the field. Students enrolled in this course will participate in instruction and lab activities involving the health, safety and environmental hazards and federal regulations surrounding natural gas. Students will participate in activities that cover the types of natural gas pipeline materials, joining techniques, and coating maintenance. Students will also be engaged in activities that cover methods used to locate and install natural gas lines, basic design theory, backfilling, purging, valve inspection and maintenance, pressure testing, customer regulations and relief design, explanation of hoop stress, shutting down the flow of gas, basic tapping and stopping techniques, construction equipment and current methods and common materials. As a capstone course, students should have the opportunity to apply their knowledge and use skills through an intensive work-based learning experience.*	
Prerequisite(s)/ Corequisite(s)	Principles of Energy Technology; Fundamentals of Electricity and Motors; Electrical Power and Distribution	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● CTE: Trade & Industry: Energy Industry 5-12 ● Technology Education 5-12 ● Workplace Specialist: Energy Industry 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	NGAS 101: Fundamentals of Natural Gas*NGAS 102: Gas Pipe Joining*; NGAS 203: Natural Gas Regulatory and Compliance Issues*; NGAS 204: Natural Gas Construction Techniques*
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	TC – Natural Gas Technology (15.0903)
Liberal Arts/Sciences Requirements	MATH 122: Applied Technical Mathematics; IVYT 113: Advanced Manufacturing Engineering and Applied Sciences
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Fundamentals of Natural Gas***
7266.D1.1	Develop the skills to understand the processing technologies associated with the production of natural gas.
7266.D1.2	Develop an understanding of the gas laws.
7266.D1.3	Explain and perform leak testing on natural gas lines.
7266.D1.4	Describe the molecular structure, process theory, and terminology during the production of natural gas.
7266.D1.5	Identify the equipment and auxiliary systems which support the production and processing of natural gases.
7266.D1.6	Demonstrate proper safety techniques used in working with natural gas.
Domain	***Gas Pipe Joining***
7266.D2.1	Understand the tubing specifications, materials, and fittings.
7266.D2.2	Procedures used in bending, cutting, and installing tubing.
7266.D2.3	Understand the basics of tubing in a hydraulic system.
7266.D2.4	Identify and understand the factors of tubing and hoses differ from piping.
7266.D2.5	Understand how piping is sized, fitted, bent, and joined. [a, e, f, g, i]
7266.D2.6	Repair methods used on specific material types used in pipe joining
Domain	***Natural Gas Regulatory and Compliance Issues***
7266.D3.1	Understand the requirements for effective leak survey and patrol requirements.
7266.D3.2	Learn how the Department of Transportation Regulations is used in natural gas companies.
7266.D3.3	Internal and external corrosion testing, identification, and monitoring.
7266.D3.4	Identify the integrity of the pipeline.
7266.D3.5	Understand the requirements for regulatory reporting.
7266.D3.6	Prevent damage to natural gas lines.
7266.D3.7	Learn how to apply and use the regulations identified by the Department of Transportation.
7266.D3.8	Requirements of a natural gas operator.
Domain	***Natural Gas Construction Techniques***

7266.D4.1	Learn the planning techniques for new construction.
7266.D4.2	Learn Route selection for new construction.
7266.D4.3	Regulatory requirements of pipeline construction.
7266.D4.4	The design of natural gas pipelines.
7266.D4.5	How to string the pipe for construction.
7266.D4.6	How to trench and backfill the pipeline construction.
7266.D4.7	How to test the pipelines before usage.

Natural Gas Capstone		
Career Cluster	Energy & Natural Resources	
Program of Study	Energy Technology	
NLPS Sequence	D	
Course Code	7266	
Course Description	*The Natural Gas Capstone course builds upon the knowledge and skills developed in the Principles of Energy Technology, Basic Electrical and Motor Controls, and Electrical Power Distribution courses by developing advanced skills that students can apply to the field. Students enrolled in this course will participate in instruction and lab activities involving the health, safety and environmental hazards and federal regulations surrounding natural gas. Students will participate in activities that cover the types of natural gas pipeline materials, joining techniques, and coating maintenance. Students will also be engaged in activities that cover methods used to locate and install natural gas lines, basic design theory, backfilling, purging, valve inspection and maintenance, pressure testing, customer regulations and relief design, explanation of hoop stress, shutting down the flow of gas, basic tapping and stopping techniques, construction equipment and current methods and common materials. As a capstone course, students should have the opportunity to apply their knowledge and use skills through an intensive work-based learning experience.*	
Prerequisite(s)/ Corequisite(s)	Principles of Energy Technology; Fundamentals of Electricity and Motors; Electrical Power and Distribution	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12	

	● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● CTE: Trade & Industry: Energy Industry 5-12 ● Technology Education 5-12 ● Workplace Specialist: Energy Industry 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	NGAS 101: Fundamentals of Natural Gas*NGAS 102: Gas Pipe Joining*; NGAS 203: Natural Gas Regulatory and Compliance Issues*; NGAS 204: Natural Gas Construction Techniques*
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	TC – Natural Gas Technology (15.0903)
Liberal Arts/Sciences Requirements	MATH 122: Applied Technical Mathematics; IVYT 113: Advanced Manufacturing Engineering and Applied Sciences
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Fundamentals of Natural Gas***
7266.D1.1	Develop the skills to understand the processing technologies associated with the production of natural gas.
7266.D1.2	Develop an understanding of the gas laws.
7266.D1.3	Explain and perform leak testing on natural gas lines.
7266.D1.4	Describe the molecular structure, process theory, and terminology during the production of natural gas.
7266.D1.5	Identify the equipment and auxiliary systems which support the production and processing of natural gases.
7266.D1.6	Demonstrate proper safety techniques used in working with natural gas.
Domain	***Gas Pipe Joining***
7266.D2.1	Understand the tubing specifications, materials, and fittings.
7266.D2.2	Procedures used in bending, cutting, and installing tubing.
7266.D2.3	Understand the basics of tubing in a hydraulic system.
7266.D2.4	Identify and understand the factors of tubing and hoses differ from piping.
7266.D2.5	Understand how piping is sized, fitted, bent, and joined. [a, e, f, g, i]
7266.D2.6	Repair methods used on specific material types used in pipe joining
Domain	***Natural Gas Regulatory and Compliance Issues***

7266.D3.1	Understand the requirements for effective leak survey and patrol requirements.
7266.D3.2	Learn how the Department of Transportation Regulations is used in natural gas companies.
7266.D3.3	Internal and external corrosion testing, identification, and monitoring.
7266.D3.4	Identify the integrity of the pipeline.
7266.D3.5	Understand the requirements for regulatory reporting.
7266.D3.6	Prevent damage to natural gas lines.
7266.D3.7	Learn how to apply and use the regulations identified by the Department of Transportation.
7266.D3.8	Requirements of a natural gas operator.
Domain	***Natural Gas Construction Techniques***
7266.D4.1	Learn the planning techniques for new construction.
7266.D4.2	Learn Route selection for new construction.
7266.D4.3	Regulatory requirements of pipeline construction.
7266.D4.4	The design of natural gas pipelines.
7266.D4.5	How to string the pipe for construction.
7266.D4.6	How to trench and backfill the pipeline construction.
7266.D4.7	How to test the pipelines before usage.

Renewable Energy Alternatives	
Career Cluster	Energy & Natural Resources
Program of Study	Energy Technology
NLPS Sequence	D
Course Code	7365
Course Description	*The Renewable Energy Alternative Capstone course builds upon the knowledge and skills developed in the Principles of Energy Technology, Basic Electrical and Motor Controls, and Electrical Power Distribution courses by developing advanced skills that students can apply to the field. Students enrolled in this course will participate in instruction and lab activities that covers aspects of installation and maintenance of residential and commercial scale solar power and heat, wind power, and geothermal heat systems. Students will participate in activities that cover site selection, topographic map reading, meteorology, wind turbine construction, wind power system components, and wind turbine safety, leading technologies in the solar industry, photovoltaic system safety and PPE requirements, electrical circuits and multimeter practices, PV module function and build, charge controller and inverter operation, battery systems, and PV system wiring and code requirements. Upon completion of this course students will be able to earn the Small Wind Installer - Level 1 (SWI1) certification and the Photovoltaic Installer – Level I (PVI1) certification.*
Prerequisite(s)/ Corequisite(s)	Principles of Energy Technology; Fundamentals of Electricity and Motors; Electrical Power and Distribution
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	Counts as a Directed Elective or Elective for all diplomas

Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Industrial Arts K-12	
Rules 46-47	● Industrial Technology 9-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● CTE: Trade & Industry: Energy Industry 5-12 ● Technology Education 5-12 ● Workplace Specialist: Energy Industry 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	SUST 101: Wind Power; SUST 102: Solar Wind Geothermal Systems*; ENRG 111: Smart Grid Home Integration*; ENRG 202: Photovoltaic System Installation*	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC – TC – Renewable Energy Technology (15.1701)	
Liberal Arts/Sciences Requirements	MATH 122: Applied Technical Mathematics; IVYT 113: Advanced Manufacturing Engineering and Applied Sciences	
Promoted Certifications		

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Wind Power***
7365.D1.1	Discuss the wind energy industry
7365.D1.2	Explore key factors in industry decisions
7365.D1.3	Investigate wind park development: sites and construction
7365.D1.4	Predict short term weather conditions
7365.D1.5	Identify players and roles in wind park operations
7365.D1.6	Explain the operation of a wind turbine
7365.D1.7	Practice safe doffing and donning procedures of personal fall arrest system equipment
7365.D1.8	Investigate types of towers, designs, and wind turbine safety
7365.D1.9	Inspect climbing and fall protection equipment

7365.D1.10	Understand the importance of generator and wind electrical systems
7365.D1.11	Discuss the function of gearboxes
7365.D1.12	Learn how wind turbines integrate with the grid
7365.D1.13	Estimate wind turbine performance
7365.D1.14	Attain readiness to take the ETA Small Wind Installer - Level 1 (SWI1)
Domain	***Wind, Solar, Geothermal Systems***
7365.D2.1	Differentiate grid-tied, grid interactive and off-grid systems.
7365.D2.2	Understand procedures for grid interaction and relationship with power companies.
7365.D2.3	Identify varieties of PV cells.
7365.D2.4	Investigate materials and equipment for PV installation.
7365.D2.5	Describe installation considerations for PV.
7365.D2.6	Model a PV system and requirements.
7365.D2.7	Identify varieties of solar heat.
7365.D2.8	Investigate materials and equipment for solar heat installation.
7365.D2.9	Describe installation considerations for solar heat.
7365.D2.10	Model a solar heat system and requirements.
7365.D2.11	Identify varieties of wind generators.
7365.D2.12	Investigate materials and equipment for wind generator installation.
7365.D2.13	Describe installation considerations for wind generators.
7365.D2.14	Model a wind generator system and requirements.
7365.D2.15	Identify varieties of geothermal heat systems.
7365.D2.16	Investigate materials and equipment for geothermal heat systems installation.
7365.D2.17	Describe installation considerations for geothermal heat systems.
7365.D2.18	Model a geothermal heat system and requirements. Install a wind and solar array.
Domain	***Smart Grid Home Integration***
7365.D3.1	Introduces the Smart Meter and In Home Display.
7365.D3.2	Developing a Home Energy Efficiency Plan.
7365.D3.3	Conduct a Home Energy Audit.
7365.D3.4	Upgrade home energy efficiency by reducing heat transfer.
7365.D3.5	Analyze energy efficiency lighting and entertainment systems.
7365.D3.6	Develop solar power systems for the home.
7365.D3.7	Install wind turbine power for the home.
7365.D3.8	Perform Energy Audit.
7365.D3.9	Analyze Power Quality Data.
7365.D3.10	Critique viability of other systems.
Domain	***Photovoltaic System Installation***
7365.D4.1	Discuss the solar energy industry.
7365.D4.2	Demonstrate photovoltaic system safety.
7365.D4.3	Review electrical circuit fundamentals.
7365.D4.4	Practice solar site evaluation and data collection.
7365.D4.5	Understand the physical construction of PV modules.
7365.D4.6	Learn battery maintenance, wiring, and charge cycles.

7365.D4.7	Examine charge controller configuration.
7365.D4.8	Understand inverters and their functions.
7365.D4.9	Learn PV wiring and code regulations.
7365.D4.10	Design and size PV systems.
7365.D4.11	Learn installation techniques for solar array mounting systems.
7365.D4.12	Practice maintenance and troubleshooting of PV systems.
7365.D4.13	Attain readiness to take the ETA Photovoltaic Installer – Level I (PVI1) Certification exam.

Energy & Natural Resources Natural Resources							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7117	Principles of Agriculture	5180	Natural Resources	7270	Forestry and Wildlife Management	7262	Agricultural Research Capstone
				7271	Soil and Water Management		
				5229	Sustainable Energy Alternatives		

Principles of Agriculture		
Career Cluster	Agriculture	
Program of Study	Ag Mechanical and Engineering, Agri-Science – Plants or Animals, Horticulture, Landscaping, Natural Resources, Precision Agriculture	
NLPS Sequence	A	
Course Code	7117	
Course Description	*Principles of Agriculture is a two-semester course that will cover the diversity of the agricultural industry and agribusiness concepts. Students will develop an understanding of the role of agriculture in the United States and globally. Students will explore Agriculture, Food, and Natural Resource (AFNR) systems related to the production of food, fiber and fuel and the associated health, safety and environmental management systems. Topics covered in the course range from animals, plants, food, natural resources, ag power, structures and technology, and agribusiness. Participation in FFA and Supervised Agricultural Experiences (SAE) will be an integral part of this course in order to develop leadership and career ready skills.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	

Rules 46-47	● Any Agribusiness License 9-12 ● Any Standard Agriculture license ● Occupational Specialist I, II, or III in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Agribusiness Management ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
REPA/REPA 3	● CTE: Agriculture 9-12 ● Workplace Specialist: Agribusiness 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway with a balance of all Agriculture relatable subject matter
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 100: Introduction to Agriculture; AGRI 102: Agricultural Business and Farm Management
VU Course Alignment	AGBS 101: Introduction to Agribusiness Management
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Urban Horticulture (1.0601), CT Landscaping Technician (1.0605), TC Precision Agriculture Specialist (1.0201) VU - CG Agribusiness (1.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***AFNR Systems***
7117.D1.1	Describe the role of agriculture in US and global societies through the domestication and distribution of the world's important crop and livestock species.
7117.D1.2	Recognize the diversity of AFNR systems in the US and the world.
7117.D1.3	Understand the size and productivity of farms and ranches in the US and around the world.
7117.D1.4	Understand US production systems for major grain crops, including Crop Rotation Systems, Tillage Systems, Variety Selection, and Harvest and grain storage technology.
7117.D1.5	Understand US production systems for major livestock animals.
7117.D1.6	Research, examine, and discuss issues and trends that impact AFNR systems on local, state, national and global levels.
7117.D1.7	Examine technologies and analyze their impact on AFNR systems.
Domain	***Agribusiness***
7117.D2.1	To have students develop an understanding of how economics relates to agriculture, and how economic principles are used to analyze and solve problems in agriculture and agribusiness.

7117.D2.2	To have students understand the structure of the U.S. Agriculture and how agriculture interacts with the aggregate economic system.
7117.D2.3	To have students recognize the role of producers, input suppliers, food marketing organizations, and consumers in the U.S. Agricultural economy.
7117.D2.4	Help students understand the qualities and characteristics employers in agribusiness expect in prospective employees and how students can develop those qualities and characteristics.
7117.D2.5	Describe the diversity of jobs and careers in agricultural industries in Indiana and the US.
Domain	***Safety, Health, and Environment Management Systems***
7117.D3.1	Identify and explain the implications of required regulations to maintain and improve safety, health, and environmental management systems.
7117.D3.2	Summarize the importance of safety, health, and environmental management in the workplace.
7117.D3.3	Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.
Domain	***Supervised Agriculture Experience (SAE)***
7117.D4.1	Explain the nature of and become familiar with those terms related to an SAE program.
7117.D4.2	Explore the numerous possibilities for an SAE program which a student might develop.
7117.D4.3	Develop an individual SAE program and implementation plan for record keeping skills.
Domain	***Agricultural Business and Farm Management***
7117.D5.1	Discuss the basic principles of management and decision-making as related to both farm and non-farm agribusiness.
7117.D5.2	Apply economic principles to case studies in farm and agribusiness.
7117.D5.3	Understand the major financial statements: what they report, how to interpret and use the data and how they are connected
7117.D5.4	Know the alternatives to meeting needs when resource analysis indicates the labor input in a business needs altered. Includes review of resume, interviewing and other job application skills.
7117.D5.5	Identify the best combination of resources to use relative to the enterprises selected for the operation including crop inputs, livestock inputs, machinery and equipment, and farmstead and buildings.
7117.D5.6	Know the alternatives for farm recordkeeping and analysis
7117.D5.7	The student will learn to work with others in a management team to combine a limited number of inputs (price, credit policy, advertising dollars, and quantity ordered) within given parameters to experience the outcomes (profits). Emphasis is placed on the practical application of financial statements for analysis.
Domain	***Career Navigation***
7117.D6.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7117.D6.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7117.D6.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7117.D6.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.

Domain	Leadership and Employability Skills
7117.D7.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7117.D7.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7117.D7.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7117.D7.4	Examine personal, wellness, and stress management strategies.
Domain	**College and Career Readiness Skills**
7117.D8.1	Demonstrate computer literacy skills and basic computer functions.
7117.D8.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7117.D8.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7117.D8.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Natural Resources		
Career Cluster	Energy & Natural Resources	
Program of Study	Natural Resources	
NLPS Sequence	B	
Course Code	5180	
Course Description	*Natural Resources is a two semester course that provides students with a background in environmental science and conservation. Course work includes hands-on learning activities that encourage students to investigate areas of environmental concern. Students are introduced to the following areas of natural resources: soils, the water cycle, air quality, outdoor recreation, forestry, minerals, interrelationships between humans and natural systems, wetlands, wildlife, safety, careers, leadership, and supervised agricultural experience programs.*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I

Bulletin 400	● Vocational Agriculture K-12
Rules 46-47	● Any Agribusiness License 9- 12 Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Natural Resources 9-12
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Natural Resources Management
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Natural Resources 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 115: Natural Resources Management
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Safety***
5180.D1.1	Demonstrate safety practices when working in an outdoor environment
5180.D1.2	Use proper safety practices/personal protective equipment when working with natural resources for work and recreation
5180.D1.3	Identify and utilize proper safety practices and personal protective equipment in laboratory settings
Domain	***Natural Resources Management***
5180.D2.1	Analyze the interdependence of organisms within an ecosystem (e.g., food webs, niches, impact of keystone species, etc.) and assess the dependence of organisms on non-living components (climate, geography, energy flow, nutrient cycling, etc.)
5180.D2.2	Evaluate biodiversity in ecosystems and devise strategies to enhance the function of an ecosystem and the availability of natural resources by increasing the level of biodiversity
5180.D2.3	Identify different types of biotic (e.g., plants, animals, etc.) and abiotic (e.g., minerals, wind, solar, water, air, etc.) natural resources to protect, conserve, manage, and understand their role in a healthy ecosystem
5180.D2.4	Identify invasive species and understand their impact on the environment
Domain	***Ecology***
5180.D3.1	Assess the role that the atmosphere plays in the regulation of natural cycles (nitrogen, water, carbon, etc.)

5180.D3.2	Assess the causes (e.g., human, natural, etc.) and impacts of climate change, and discuss strategies to lessen its impact on natural resource systems
5180.D3.3	Identify aquatic systems (e.g., wetlands, watersheds, riparian zones, etc.) and evaluate their role in ecosystem function
5180.D3.4	Analyze how ground and surface water quality and quantity affect ecosystem function
5180.D3.5	Describe the stages of ecological succession
5180.D3.6	Analyze and summarize examples of habitat disturbances and habitat resilience
5180.D3.7	Compare and contrast techniques associated with sustainable forestry (e.g., timber stand improvement, diversity improvement, reforestation, etc.) to develop a management plan
5180.D3.8	Compare and contrast techniques associated with soil management (e.g., soil survey and interpretation, erosion control, etc.) to develop a management plan (e.g., erosion control, maximizing biodiversity, plant productivity, soil health, etc.)
5180.D3.9	Comprehend and apply ecological concepts (e.g., population ecology, population density and population dispersion, etc.) to living organisms in natural resource systems
5180.D3.10	Analyze factors that influence the establishment and spread of invasive species, evaluate their impact, and determine the appropriate steps to prevent or minimize the impact of invasive species
Domain	***Humans and Natural Resources***
5180.D4.1	Identify the history and specific purpose of agencies (e.g., SWCD, NRCS, USDA, FSA, etc.) and laws associated with natural resources systems on local, state, and national levels (e.g., water regulations, game laws, historic preservation laws, environmental policy, etc.)
5180.D4.2	Evaluate the impact and effectiveness of agencies associated with natural resources systems
5180.D4.3	Assess and explain how different kinds of human activity (e.g., agriculture, industry, transportation, etc.) affect the use and availability of natural resources (soil, minerals, wildlife, water, etc.)
5180.D4.4	Discuss causes and solutions of species extinction and the importance of biodiversity
5180.D4.5	Analyze how social considerations can affect the use and sustainability of natural resources such as wind turbines, solar panel farms, and hydro-electric dams
5180.D4.6	Examine and explain how economics affect the exploitation, conservation, and preservation of natural resources
5180.D4.7	Develop strategies and materials to communicate information to the public regarding topics related to the management, protection, enhancement, and improvement of natural resources
5180.D4.8	Assess the sustainable production, harvesting, processing and use of plant, animal, and aquatic wildlife species
5180.D4.9	Assess the sustainable extraction, processing and use of minerals and fossil fuels
5180.D4.10	Identify, assess, and apply the uses of natural resources for outdoor recreation opportunities
Domain	***Maintenance and Protection***
5180.D5.1	Identify and assess methods (e.g., fire, grazing, harvesting, plantings, etc.) used to manage and

	improve forests, rangeland, wildlife habitat, and the biological health of streams
5180.D5.2	Identify and assess management techniques for improving outdoor recreation opportunities
5180.D5.3	Identify, assess, and apply the uses of natural resources for outdoor recreation opportunities
5180.D5.4	Demonstrate geospatial skills, tools, and technologies to aid in developing, implementing, and evaluating natural resource management plans (land surveys, geographic coordinate systems, GIS data, etc.)
5180.D5.5	Identify and discuss ecologically harmful species and diseases

Forestry and Wildlife Management		
Career Cluster	Energy & Natural Resources	
Program of Study	Natural Resources	
NLPS Sequence	C	
Course Code	7270	
Course Description	*Forestry and Wildlife Management is a two semester course that provides students with opportunities to participate in a variety of activities including laboratory work. Students will explore concepts related to environmental and ecological impacts, forestry management, timber harvesting, tree production, and wood utilization, as well as environmental issues and career exploration*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9- 12 ● Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Agriculture 9-12	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Landscape Management ● Workplace Specialist: Ornamental Horticulture	
REPA/REPA 3	● CTE: Agriculture 5-12	

	● Workplace Specialist: Landscape Management 9-12 ● Workplace Specialist: Ornamental Horticulture 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	
7270.D1.1	Define forestry and explain the importance of forestry and forestry management
7270.D1.2	Identify the role of government and private organizations in managing forestry resources
7270.D1.3	Analyze historic and current trends in the forestry industry
7270.D1.4	Evaluate and analyze the interrelationships between forestry and humans.
7270.D1.5	Compare and contrast techniques associated with sustainable forestry (e.g., timber stand improvement, diversity improvement, reforestation, etc.).
7270.D1.6	Analyze a forest to determine which forestry techniques would improve that habitat.
7270.D1.7	Devise a forest management plan that improves the habitat while sustainably maximizing the amount of timber that can be harvested.
7270.D1.8	Define forest ecology, structure, and types of forest classifications
7270.D1.9	Investigate physical characteristics of trees, plant processes, growth, and taxonomy.
7270.D1.10	Explain the environmental and economic impact of deciduous and coniferous trees native to Indiana
7270.D1.11	Distinguish wood characteristics including wood properties, products, wood identification, and physiology.
7270.D1.12	Identify and safely utilize forestry tools and equipment.
7270.D1.13	Survey land and cruise timber.
7270.D1.14	Recommend management practices including genetic potential, reforestation, timber stand improvement, and harvesting.
7270.D1.15	Evaluate methods for forest protection from insect, disease, and other destructive agents.
Domain	
7270.D2.1	Analyze the dynamics of an ecosystem.
7270.D2.2	Examine the diverse components of habitat and its relation to wildlife.

7270.D2.3	Calculate the population dynamics that relate to wildlife.
7270.D2.4	Identify the human role in wildlife and habitat management as it applies to historic, social, political, and economic concerns.
7270.D2.5	Examine the human impact on wildlife resources.
7270.D2.6	Examine the federal and state laws and regulations that pertain to the conservation and preservation of wildlife.

Soil and Water Management		
Career Cluster	Energy & Natural Resources	
Program of Study	Natural Resources	
NLPS Sequence	C	
Course Code	7271	
Course Description	*Soil and Water Management is a two semester course that provides students with opportunities to participate in a variety of activities including laboratory work. Students will explore concepts related to geological information system mapping (GIS), soil and land use, water and aquatic ecology, as well as environmental issues and career exploration*	
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Fulfills a science requirement for CORE 40 diplomas Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Agribusiness License 9- 12 Any Standard Agriculture license ● Any Occupational Specialist I, II, or III in Natural Resources 9-12	
Rules 2002	● CTE: Agriculture with high school setting ● Workplace Specialist: Agriculture Education in Natural Resources Management	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Natural Resources 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		

Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	
7271.D1.1	Use analytical procedures and instruments to manage environmental service systems within soil and water
7271.D1.2	Analyze and interpret laboratory and field samples in soil and water service systems.
7271.D1.3	Collect and prepare sample measurements using appropriate data collection techniques.
7271.D1.4	Utilize data analysis to identify trends in a data sample and assess the confidence that can be drawn from those conclusions.
7271.D1.5	Properly utilize scientific instruments in soil and water monitoring situations (e.g., laboratory equipment, environmental monitoring instruments, etc.).
7271.D1.6	Calibrate and use laboratory equipment according to standard operating procedures.
7271.D1.7	Calibrate and use environmental monitoring instruments according to standard operating procedures.
7271.D1.8	Evaluate the impact of public policies and regulations on soil and water service system operations.
7271.D1.9	Interpret and evaluate the impact of laws, agencies, policies, and practices affecting soil and water service systems.
7271.D1.10	Analyze the structure of laws associated with soil and water service systems.
7271.D1.11	Analyze the specific purpose of government agencies associated with soil and water service systems.
7271.D1.12	Assess the intent, feasibility and effectiveness of policies, practices, and initiatives common in business and advocacy groups associated with soil and water systems.
7271.D1.13	Compare and contrast the impact of current trends on regulation of soil and water service systems (e.g., climate change, population growth, international trade, etc.).
7271.D1.14	Develop proposed solutions to environmental issues, problems and applications using scientific principles of soil science, hydrology, microbiology, chemistry, and ecology.
7271.D1.15	Apply soil science and hydrology principles to environmental service systems.
7271.D1.16	Use a soil survey to determine the land capability classes for different parcels of land in an area.
7271.D1.17	Evaluate the soil composition in order to predict the impact of that soil on environmental service systems.
7271.D1.18	Conduct tests of soil to determine its potential for filtration of groundwater supplies and likelihood for flooding.

7271.D1.19	Assess the effectiveness of precautions taken to prevent or reduce contamination of groundwater supplies.
7271.D1.20	Apply chemistry principles to environmental service systems.
7271.D1.21	Evaluate a sample's soil chemistry and assess how the results may impact considerations in environmental service systems.
7271.D1.22	Evaluate a sample's water chemistry and assess how the results may impact considerations in environmental service systems.
7271.D1.23	Apply microbiology principles to environmental service systems.
7271.D1.24	Assess how the activities of microorganisms in soil affect environmental service systems and ecosystem biodiversity.
7271.D1.25	Analyze the microbial populations present in an area and assess how carbon cycling is affected.
7271.D1.26	Use pollution control measures to maintain safe, healthy soil and water systems.
7271.D1.27	Identify and distinguish types of pollution and distinguish between point source and nonpoint source pollution.
7271.D1.28	Research ways in which pollution can be managed and prevented and propose solutions to meet the needs of local systems.
7271.D1.29	Use tools, equipment, machinery, and technology common to tasks in soil and water service systems.
7271.D1.30	Use technological and mathematical tools to map land, facilities and infrastructure for soil and water service systems.
7271.D1.31	Demonstrate surveying and cartographic skills to make site measurements to address concerns and needs within soil and water service systems situation.
7271.D1.32	Interpret and evaluate GIS data to conclude about a scenario specific to soil and water service systems.
7271.D1.33	Analyze and document examples of utilization of breaking technology in soil and water systems.
7271.D1.34	Perform assessments of soil and water conditions using equipment, machinery, and technology.
7271.D1.35	Evaluate a sample of water to determine its quality and if it has been contaminated.
7271.D1.36	Evaluate a sample of soil to determine its quality and if it has been contaminated.

Sustainable Energy Alternatives	
Career Cluster	Energy & Natural Resources
Program of Study	Natural Resources
NLPS Sequence	C
Course Code	5229
Course Description	*Sustainable Energy Alternatives broadens a student's understanding of environmentally friendly energies. In this course students will use a combination of classroom, laboratory, and field experiences to analyze, critique, and design alternative energy systems. Class content and activities center on renewability and sustainability for our planet. Topics covered in this*

	course include the following types of alternative energies: solar, wind, geothermal, biomass and emerging technologies. Leadership development, supervised agricultural experiences, and career exploration opportunities are explored in the field. Sustainable energy is also included.
Prerequisite(s)/ Corequisite(s)	Principles of Agriculture
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Fulfills a science course requirement for all diplomas Counts as STEM-Focused credit for new diploma
Dual Credit Status	X (PCL/CTE)
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Vocational Agriculture K-12	
Rules 46-47	● Any Standard Agriculture license	
Rules 2002	● CTE: Agriculture with high school setting	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Workplace Specialist: Sustainable Energy 9-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AGRI 119: Sustainable and Alternative Energy
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Renewable Energy***
5229.D1.1	Students apply knowledge of renewable resources to the management of those resources.
5229.D1.2	Differentiate renewable fuels and renewable energy
5229.D1.3	Differentiate renewable, non-renewable, sustainable, and exhaustible
5229.D1.4	Identify natural sources of kinetic, thermal, and light energy
5229.D1.5	Evaluate the impact of alternative energy sources on the environment.

5229.D1.6	Explain the “green” movement
5229.D1.7	Compare appropriate energy sources per setting
5229.D1.8	Identify advantages and disadvantages to alternative energy sources
5229.D1.9	Evaluate the impact of alternative energy sources on the environment
5229.D1.10	Identify and describe various forms of energy
5229.D1.11	Explain how converting to green energy would affect the agriculture industry
5229.D1.12	Explain how converting to green energy would affect costs to producers and consumers
Domain	***Solar Energy***
5229.D2.1	Students apply concepts of renewable resources to solar energy.
5229.D2.2	Investigate passive environmental systems
5229.D2.3	Contrast photovoltaic system performances
5229.D2.4	Monitor a photovoltaic system output to effective lumen ratio
5229.D2.5	Demonstrate solar heat systems performance
5229.D2.6	Describe solar energy and how it is harnessed
5229.D2.7	Explain the difference between passive solar and active solar
5229.D2.8	Evaluate the advantages and disadvantages of using solar energy
5229.D2.9	Describe basic solar movement and effect of the Earth’s tilt
5229.D2.10	Predict solar position using solar path diagrams
5229.D2.11	Describe how a photovoltaic solar cell works
5229.D2.12	Identify factors that reduce/enhance solar irradiation
Domain	***Wind Energy***
5229.D3.1	Students apply concepts of alternative energy resources to wind energy.
5229.D3.2	Research varying wind energy systems
5229.D3.3	Design small wind blades using common materials
5229.D3.4	Investigate site issues for wind energy system
5229.D3.5	Describe wind energy and the way it is harnessed
5229.D3.6	Explain why farmers and ranchers are amenable to wind technology
5229.D3.7	Evaluate the advantages and disadvantages to wind technology
5229.D3.8	Compare topography of different quadrangles and geographical features that could affect wind conditions
5229.D3.9	Evaluate short term weather conditions and their implications on wind turbines
Domain	***Geothermal Energy***
5229.D4.1	Students discover geothermal energy as an alternative energy resource.
5229.D4.2	Differentiate geothermal power and geothermal heat
5229.D4.3	Describe geothermal heat set-up parameters
5229.D4.4	Describe geothermal energy and the way it is harnessed
5229.D4.5	Evaluate the advantages and disadvantages of using geothermal energy
5229.D4.6	Analyze a diagram of a geothermal power plant
Domain	***Biomass Systems***
5229.D5.1	Students evaluate various aspects of biomass systems as alternative energy resources.
5229.D5.2	Compare potential biomass feedstock
5229.D5.3	Identify limiting factors of the use of biomass for energy
5229.D5.4	Describe anaerobic digestion
5229.D5.5	Model a small scale Anerobic Digestion closed-loop system
5229.D5.6	Describe the process used in producing alcohol from biomass

5229.D5.7	Produce alcohol and co-products from biomass
5229.D5.8	Explain the process of transesterification
5229.D5.9	Diagram the process used in producing biodiesel from biomass
5229.D5.10	Explain the process of fermentation
5229.D5.11	Explain the process of methanogenesis
5229.D5.12	Illustrate the process used in producing methane from biomass
5229.D5.13	Produce methane and co-products from biomass
5229.D5.14	Describe the scientific principles related to composting
5229.D5.15	Explain biomass and sources of biomass
5229.D5.16	Assess the characteristics of biomass that make it useful for biofuels production
5229.D5.17	Evaluate the technologies used to create biofuels from biomass
Domain	***Energy Technologies***
5229.D6.1	Students research emerging renewable energy resource technologies.
5229.D6.2	Research other renewable sources of energy
5229.D6.3	Critique viability of other systems
5229.D6.4	Research storage issues and possibilities
5229.D6.5	Describe hydroelectric generation techniques and procedures
5229.D6.6	Discuss the feasibility of new and emerging energy resources
5229.D6.7	Discuss emerging and alternative electric power generation technologies and fuel sources
5229.D6.8	Diagram biogeochemical cycles and explain the processes
Domain	***Careers***
5229.D7.1	Students examine the scope of career opportunities in, and the importance of, agriculture to the economy.
5229.D7.2	Define and explore environmental and natural resource agriculture and environmental and natural resource agribusiness and their role in the economy
5229.D7.3	Evaluate and explore the environmental and natural resource career opportunities in agriculture
5229.D7.4	Identify how key organizational structures and processes affect organizational performance and the quality of products and services
5229.D7.5	Demonstrate those qualities, attributes, and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society
Domain	***Leadership***
5229.D8.1	Students validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education.
5229.D8.2	Acquire and demonstrate communication skills such as writing, public speaking, and listening while refining oral, written, and verbal skills
5229.D8.3	Recognize and explain the role of the FFA in the development of leadership, education, employability, communications, and human relations skills
5229.D8.4	Examine roles within teams, work units, departments, organizations, inter- organizational systems, and the larger environment
5229.D8.5	Acquire the skills necessary to positively influence others
5229.D8.6	Develop a skill set to enhance the positive evolution of the whole person
Domain	***Supervised Agriculture Experience***
5229.D9.1	Students validate the necessity of a Supervised Agricultural Experience (SAE) program as a

	critical component to a well-rounded agricultural education.
5229.D9.2	Explain the nature of and become familiar with those terms related to an SAE program
5229.D9.3	Explore the numerous possibilities for an SAE program which a student might develop
5229.D9.4	Develop an individual SAE program and implement record keeping skills

Agricultural Research Capstone		
Career Cluster	Agriculture, Energy & Natural Resources	
Program of Study	Agri-Science – Platns or Animals; Ag Mechanical and Engineering	
NLPS Sequence	D	
Course Code	7262	
Course Description	*Agricultural Research Capstone course includes extended laboratory, field, and literature investigations in one or more specialized agricultural science disciplines, such as animal, plant, food, natural resources, biotechnology, engineering, etc. Students enrolled in this course will apply scientific applications, concepts, principles, and design process to solve complex, real-world issues in agriculture. Students will become familiar with laboratory procedures used in an educational, research, or industrial setting. Students will complete an end-of-course project and presentation, such as a scientific research paper, agriscience fair project, or some other suitable presentation of their findings.*	
Prerequisite(s)/ Corequisite(s)	Any Agriculture Concentrator Sequence	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diploma Counts as STEM-Focused credit for new diploma	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Vocational Agriculture K-12 ● Science/Biology 9-12	
Rules 46-47	● Vocational Agriculture K-12 ● Any Standard Agriculture license ● Biology 9-12	
Rules 2002	● CTE: Agriculture with high school setting ● Life Science with high school setting	
REPA/REPA 3	● CTE: Agriculture 5-12 ● Life Science 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Identify a Problem***
7262.D1.1	Examine historical and current data to identify issues impacting AFNR systems.
7262.D1.2	Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems.
7262.D1.3	Evaluate and explain how scientists use the scientific method to build upon previous findings in current and emerging research.
7262.D1.4	Solve problems in AFNR workplaces or scenarios using technology.
7262.D1.5	Evaluate the importance of technology use and how it impacts AFNR systems.
7262.D1.6	Analyze and assess at least two public policies that impact each AFNR system.
7262.D1.7	Create and propose a hypothetical policy that will impact current AFNR systems.
7262.D1.8	Evaluate geographic data and select necessary data sets to solve problems within AFNR systems.
7262.D1.9	Devise a strategy to solve a problem in an AFNR system using a set of economic data.
Domain	***Design an Experiment or Research Parameters to Address Problem***
7262.D2.1	Execute health, safety, and environmental procedures to comply with regulatory and safety standards.
7262.D2.2	Construct and implement methods to evaluate compliance with required safety, health, and environmental management regulations.
7262.D2.3	Create and implement a health and safety policy plan for AFNR workplaces.
7262.D2.4	Assess various emergency response plan requirements for an AFNR workplaces and/or facility.
7262.D2.5	Examine and categorize examples of how to avoid health or safety risks in AFNR workplaces.
7262.D2.6	Create a plan to mitigate the level of contamination or injury identified as a risk in the workplace.
7262.D2.7	Design and implement plans to ensure the use of appropriate protective equipment when using various AFNR tools and equipment.
7262.D2.8	Evaluate and select appropriate tools and equipment to complete AFNR tasks.
7262.D2.9	Assess and demonstrate appropriate operation, storage, and maintenance techniques for AFNR tools and equipment.

Domain	***Conduct Research and/or Experiment***
7262.D3.1	Maintain and interpret laboratory records documented in a laboratory to ensure data accuracy and integrity (e.g., avoid bias, record any conflicts of interest, avoid misinterpreted results, etc.).
7262.D3.2	Devise a strategy for ensuring the security of data and information collected in a laboratory
7262.D3.3	Assess the need for personal protective equipment in a variety of situations and select the appropriate equipment to wear when working with biological and chemical materials.
7262.D3.4	Perform waste disposal according to the standard operating procedures.
7262.D3.5	Perform ongoing maintenance of laboratory equipment according to the standard operating procedures (e.g., calibration, testing, etc.).
7262.D3.6	Operate advanced laboratory equipment and measurement devices.
Domain	***Evaluate Findings***
7262.D4.1	Evaluate progress toward AFNR career goals and identify opportunities for improvement and necessary adjustments to one's plan of action
7262.D4.2	Implement one's personal plan of action for obtaining the required education, training and experiences and evaluate progress to identify opportunities for improvement and necessary adjustments.
7262.D4.3	Evaluate, update, and improve a set of personal tools to reflect current skills, experiences, education, goals, etc. and complete the processes needed to pursue and obtain a career in an AFNR pathway.
7262.D4.4	Assess personal skills and align them with potential career opportunities in AFNR pathways.

Financial Services

Financial Services Accounting							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
4562	Principles of Business Management	4524	Accounting Fundamentals	4522	Advanced Accounting	7252	Accounting Capstone

Principles of Business Management		
Career Cluster	Business Management; Financial Services; Marketing, Sales, & Entrepreneurship, Supply Chain & Transportation	
Program of Study	Accounting, Business Administration, Finance and Investment, Insurance, Marketing and Sales, Supply Chain and Logistics	
NLPS Sequence	A	
Course Code	4562	
Course Description	*Principles of Business Management examines business ownership, organization principles and problems, management, control facilities, administration, financial management, and development practices of business enterprises. This course will also emphasize the identification and practice of the appropriate use of technology to communicate and solve business problems and aid in decision making. Attention will be given to developing business communication, problem-solving, and decision-making skills using spreadsheets, word processing, data management, and presentation software.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12	

	● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTEpathway
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 101: Introduction to Business, OTEC 207: Integrated Microsoft Office Applications or OTEC 101: Introduction to Microcomputers
VU Course Alignment	MGMT 100: Introduction to Business, COMP 110: Introduction to Computer Concepts
Four Yr. Course Alignment	BSU – ISOM 125: Introduction to Business Computer Applications ISU - BUS 100: Introduction to Contemporary Business, BUS 180: Business Information Tools IUB - BUS X-100: Introduction to Business IUN/S/K/N - BUS W-100: Introduction to Business IUSB - BUS B-190: Introduction to Business PFW - BUS 10001: Principles of Business Administration PNW - BUSM 10100: Introduction to Business USI - MNGT 201: Survey of Management
Postsecondary Credential	ITCC - CT Business Administration, TC Business Administration (52.0201; CT Professional Bookkeeping, TC Accounting (52.0302) VU - A.S. Business Administration (52.0201), A.S. Business Management (52.0101) IUB/K/N/S/SB – B.S. Business (52.0101) PFW – B.S. Business (52.0101)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 114: Student Success in Business, Humanities/ Social & Behavioral 3-4 hours
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Business***
4562.D1.1	Identify the social, legal, economic, and ethical challenges of the business environment.

4562.D1.2	Identify management and leadership functions, and the relationship to operations and supply chain management.
4562.D1.3	Relate the characteristics of organizational structures to legal forms of business ownership including small business and entrepreneurship.
4562.D1.4	Examine the principles of short- and long-range financial planning, as well as the role of stock exchanges in the financial markets.
4562.D1.5	Analyze business issues and events related to strategic decision-making in an international and global context.
4562.D1.6	Describe the marketing mix/marketing concept and its relationship to purchasing, production, distribution, and quality.
4562.D1.7	Interpret the importance of communication and technology to the success of the organization.
4562.D1.8	List and describe the human resource functions in business.
4562.D1.9	Examine career opportunities in business.
Domain	***Business Software Applications***
4562.D2.1	Explain the purpose of information systems to support organizations and enhance productivity.
4562.D2.2	Explain the physical components and operation of microcomputers.
4562.D2.3	Use word processing, spreadsheet, database, and presentation applications to perform key business tasks.
4562.D2.4	Explain the difference between computer operating systems and user software programs.
4562.D2.5	Identify when to use appropriate features within a software application.
4562.D2.6	Utilize internet applications and “cloud” technologies in business situations.
4562.D2.7	Utilize collaboration technologies.
4562.D2.8	Explain security goals, response to threats, and safeguards.
4562.D2.9	Discuss issues related to the ethical use of information technology.
Domain	***Career Navigation***
4562.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
4562.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
4562.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
4562.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
4562.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
4562.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
4562.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
4562.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***

4562.D5.1	Demonstrate computer literacy skills and basic computer functions.
4562.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
4562.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
4562.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Accounting Fundamentals		
Career Cluster	Business Management; Financial Services	
Program of Study	Business Administration, Accounting, Finance and Investment	
NLPS Sequence	B	
Course Code	4524	
Course Description	*Accounting Fundamentals introduces the language of business using Generally Accepted Accounting Principles (GAAP) and procedures for proprietorships and partnerships using double-entry accounting. Emphasis is placed on accounting principles as they relate to both manual and automated financial systems. This course involves understanding, analyzing, and recording business transactions and preparing, analyzing, and interpreting financial reports as a basis for decision-making.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9- 12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Accounting & Finance 9-12	

REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Accounting & Finance 9-12 ● CTE: Trade & Industrial: Accounting & Finance 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ACCT 101: Financial Accounting
VU Course Alignment	ACCT 100: Basic College Accounting
Four Yr. Course Alignment	ISU - BUS 201: Principles of Accounting I PNW - ACC 20000: Introductory Accounting BSU – ACC 201: Principles of Finance and Accounting
Postsecondary Credential	ITCC - CT Business Administration (52.0201), TC Business Administration (52.0201); CT Professional Bookkeeping, TC Accounting (52.0302) VU - CG Accounting (52.0305) ISU – B.S. Business Administration (52.0101) PNW – B.S. Accounting (52.0101) BSU - B.A./B.S. in Accounting (52.0301)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 114: Student Success in Business, Humanities/Social & Behavioral 3-4 hours
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Financial Accounting***
4524.D1.1	Recognize the meaning and function of accounting, its importance, and basic US accounting rules and the body most responsible for their development.
4524.D1.2	Use the accounting cycle, including analyzing and recording transactions and preparing basic financial statements in accordance with accrual accounting principles.
4524.D1.3	Account for buying and selling merchandise, including using LIFO, FIFO, and weighted average to assign values to cost of goods sold and ending inventory.
4524.D1.4	Recognize the purpose, advantages, disadvantages, and limitations of internal controls. Prepare a bank reconciliation.
4524.D1.5	Account for uncollectible accounts receivable using the allowance method.
4524.D1.6	Account for notes receivable, including interest accruals.
4524.D1.7	Account for notes payable, including interest accruals. Recognize acceptable accounting for basic payroll and other short-term liabilities.
4524.D1.8	Recognize the cost of a plant asset and use accepted method(s) to depreciate a plant asset. Account for the disposal of plant assets. Recognize acceptable accounting for other non-current assets.

4524.D1.9	Calculate the present value of bonds at issuance and account for borrowing by issuing bonds.
4524.D1.10	Account for issuing common and preferred stock, treasury stock transactions, and for dividends.
4524.D1.11	Prepare a multi-step income statement and a classified balance sheet. Given cash pieces, prepare a statement of cash flows.
4524.D1.12	Analyze a set of financial statements for profitability and liquidity.

Advanced Accounting		
Career Cluster	Financial Services	
Program of Study	Accounting	
NLPS Sequence	C	
Course Code	4522	
Course Description	*Advanced Accounting expands on the Generally Accepted Accounting Principles (GAAP) and procedures for various forms of business ownership using double-entry accounting covered in Accounting Fundamentals, including an emphasis on payroll accounting. Topics covered include calculating gross pay, withholdings, net pay, direct deposits, journalizing payroll transactions and preparing individual earnings records and payroll registers. Emphasis is placed on applying Generally Accepted Accounting Principles through hands-on practice with popular commercial accounting software packages that are currently used in business.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management; Accounting Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business: Accounting & Finance	
REPA/REPA 3	● Business 5-12	

	● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Accounting & Finance 9-12 ● CTE: Trade & Industrial: Accounting & Finance 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ACCT 122: Accounting Systems Application, ACCT 106: Payroll Accounting
VU Course Alignment	ACCT 206: Payroll Accounting, ACCT 291: Accounting with QuickBooks
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Professional Bookkeeping, TC Accounting (52.0302) VU - CG Accounting (52.0305)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, Humanities/Social & Behavioral Science (3-4), IVYT 111: Student Success for University Transfer VU - ENGL 101: English Composition I, COMM 143: Speech, MATT 109: Business Mathematics or MATH 102: College Algebra
Promoted Certifications	Quickbooks
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Payroll Accounting***
4522.D1.1	Understand and apply the Fair Labor Standards Act, Social Security, Federal Income Tax Withholding, Unemployment tax, and other laws and acts that affect payroll.
4522.D1.2	Calculate gross pay, regular pay, overtime pay, and overtime premium pay.
4522.D1.3	Calculate the following withholdings from gross pay: FICA, Federal Income Tax, State Income Tax, County Income Tax, and other deductions.
4522.D1.4	Calculate employer taxes and other employee benefits (paid by the employer): FICA, FUTA, SUTA, workers' compensation, and other benefits paid by employer.
4522.D1.5	Record payroll data using the double-entry accounting method of recording, classifying, summarizing, and reporting transactions.
4522.D1.6	Prepare appropriate payroll tax forms: withholding tax (Federal and State), unemployment tax, (Federal and State), payroll register, employee's earnings record, other appropriate forms or schedules.
4522.D1.7	Demonstrated project or a series of learning problems.
Domain	***Accounting Systems Application***
4522.D2.1	Use accounting software to set up a company's General Ledger Chart of Accounts and needed subsidiary ledgers including but not limited to Accounts Receivable, Accounts Payable, Inventory, Fixed Assets, and Payroll.
4522.D2.2	Use accounting software to perform the complete accounting cycle to analyze, to record in the most appropriate module, to adjust, to report and to perform periodic closing of financial information.
4522.D2.3	Analyze data and reports generated by accounting software.

4522.D2.4	Communicate effectively using correct Standard English, both orally and in writing by completion of papers, projects and/or presentations. Input numeric data using proper keying techniques.
4522.D2.5	Think critically and independently analyze to solve accounting problems.

Accounting Capstone		
Career Cluster	Financial Services	
Program of Study	Accounting	
NLPS Sequence	D	
Course Code	7252	
Course Description	*The Accounting Capstone course emphasizes Managerial Accounting concepts and Income Tax Accounting for individuals and sole proprietorships. Topics include general versus cost accounting systems, cost behavior, cost-volume profit analysis, budgeting, standard cost systems, responsibility accounting, incremental analysis, and capital investment analysis. Offers an overview of federal and state income tax law for individuals including taxable income, capital gains and losses, adjustments, standard and itemized deductions, tax credits and appropriate tax forms. When offered for multiple credits per semester, the Accounting Capstone may be used to provide students the opportunity to participate in an intensive WBL experience and/or to complete additional coursework in using spreadsheets to solve accounting cases and to complete a postsecondary credential from ITCC or VU.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management; Accounting Fundamentals; Advanced Accounting	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business: Accounting & Finance	

REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Accounting & Finance 9-12 ● CTE: Trade & Industrial: Accounting & Finance 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ACCT 102: Managerial Accounting, ACCT 205: Income Tax, OTEC 218: Microsoft Excel
VU Course Alignment	VU-EC - COMP 242: Creating a Personal Brand and e-Portfolio, OADM 233: Spreadsheets
Four Yr. Course Alignment	BSU – ACC 202: Principles of Managerial Accounting
Postsecondary Credential	ITCC - CT Professional Bookkeeping, TC Accounting (52.0302) VU-EC - CG Accounting (52.0305) BSU - B.A./B.S. in Accounting (52.0301)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, Humanities/Social & Behavioral Science (3-4), IVYT 111: Student Success for University Transfer VU - ENGL 101: English Composition, COMM 143: Spee4524ch, MATT 109: Business Mathematics or MATH 102 College Algebra
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Managerial Accounting***
7252.D1.1	Discuss the difference between financial and managerial accounting and identify the characteristics, process, organization, and the profession of managerial accounting.
7252.D1.2	Define and discuss the concepts, procedures, and characteristics of a manufacturing process with a job order cost system.
7252.D1.3	Distinguish between the process cost system and the job-order cost system and describe and illustrate a process cost accounting system.
7252.D1.4	Describe the nature and objectives of budgeting, including procedures and various reports.
7252.D1.5	Describe and illustrate methods used for evaluation of capital investment proposals, capital rationing and planning, and controlling capital investment expenditures.
7252.D1.6	Describe and explain the nature and types of decentralization.
7252.D1.7	Define and discuss responsibility accounting for investment centers and transfer pricing.
7252.D1.8	Describe and illustrate inventory control, quantitative techniques for estimating costs, and the learning effect in estimating costs.
7252.D1.9	Define and explain the managerial use of expected value concept, variance analysis using expected value, and maximum concepts of decision-making policies.
7252.D1.10	Define and illustrate the usefulness of financial statement analysis, types of analysis, basic analytical procedures, solving analysis, profitability analysis, and selection of analytical procedures.

7252.D1.11	Describe the nature of concepts of working capital, analysis of cash, and cash flow from operations.
7252.D1.12	Identify and illustrate the characteristics of other selected topics.
Domain	***Income Tax***
7252.D2.1	Utilize a tax vocabulary to discuss general concepts of U.S. income tax law for various taxable entities and to carefully read forms and instructions.
7252.D2.2	Define the general tax formula or structure and place concepts as they are covered in the course within that framework.
7252.D2.3	Discuss components of gross income, identifying whether these are excluded or included for federal income tax purposes.
7252.D2.4	Discuss adjustments to gross income and calculate adjusted gross income (AGI).
7252.D2.5	Discuss the standard deduction or itemized deductions and the deduction for exemptions to arrive at taxable income.
7252.D2.6	Determine federal income tax less appropriate credits to arrive at tax due or to be refunded.
7252.D2.7	Complete a tax return for an individual using the appropriate form 1040 and necessary schedules.
7252.D2.8	Describe acceptable accounting methods for income tax purposes.
7252.D2.9	Prepare a schedule C and/or schedule F (including depreciation schedules) with an accompanying schedule SE using the appropriate tax method.
7252.D2.10	Discuss the rules for deducting IRAs and other retirement plans.
7252.D2.11	Define a capital asset, contrast accounting vs. tax methods, explain the tax treatment of such assets, prepare a schedule D, and describe the tax treatment of sale of business assets including the filing of form 4797.
7252.D2.12	Discuss the requirements of a tax preparer and explain the rules of tax compliance and the role and procedures of the IRS.
7252.D2.13	Identify various tax planning techniques such as deferral or acceleration of income.
7252.D2.14	Communicate effectively using correct standard English, both orally and in writing by completion of papers, projects and/or presentations.
Domain	***Microsoft Excel***
7252.D3.1	Create worksheets and workbooks.
7252.D3.2	Navigate through worksheets and workbooks.
7252.D3.3	Format worksheets and workbooks.
7252.D3.4	Customize options and views for worksheets and workbooks.
7252.D3.5	Configure worksheets and workbooks to print or save.
7252.D3.6	Insert data in cells and ranges.
7252.D3.7	Format cells and ranges.
7252.D3.8	Order and group cells and ranges.
7252.D3.9	Create a table.
7252.D3.10	Modify a table.
7252.D3.11	Filter and sort a table.
7252.D3.12	Utilize cell ranges and references in formulas and functions.
7252.D3.13	Summarize data with functions.
7252.D3.14	Utilize conditional logic in functions.
7252.D3.15	Format and modify text with functions.

7252.D3.16	Create a chart.
7252.D3.17	Format a chart.
7252.D3.18	Insert and format an object.
7252.D3.19	Recognize special and/or advanced software features as they relate to software certifications.

Financial Services Finance and Investment							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
4562	Principles of Business Management	7150	Personal Finance and Banking	5258	Finance and Investment	7265	Finance and Investment Capstone
		4524	Accounting Fundamentals				

Principles of Business Management		
Career Cluster	Business Management; Financial Services; Marking, Sales, & Entrepreneurship, Supply Chain & Transportation	
Program of Study	Accounting, Business Administration, Finance and Investment, Insurance, Marketing and Sales, Supply Chain and Logistics	
NLPS Sequence	A	
Course Code	4562	
Course Description	*Principles of Business Management examines business ownership, organization principles and problems, management, control facilities, administration, financial management, and development practices of business enterprises. This course will also emphasize the identification and practice of the appropriate use of technology to communicate and solve business problems and aid in decision making. Attention will be given to developing business communication, problem-solving, and decision-making skills using spreadsheets, word processing, data management, and presentation software.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12	

	● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTEpathway
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 101: Introduction to Business, OTEC 207: Integrated Microsoft Office Applications or OTEC 101: Introduction to Microcomputers
VU Course Alignment	MGMT 100: Introduction to Business, COMP 110: Introduction to Computer Concepts
Four Yr. Course Alignment	BSU – ISOM 125: Introduction to Business Computer Applications ISU - BUS 100: Introduction to Contemporary Business, BUS 180: Business Information Tools IUB - BUS X-100: Introduction to Business IUN/S/K/N - BUS W-100: Introduction to Business IUSB - BUS B-190: Introduction to Business PFW - BUS 10001: Principles of Business Administration PNW - BUSM 10100: Introduction to Business USI - MNGT 201: Survey of Management
Postsecondary Credential	ITCC - CT Business Administration, TC Business Administration (52.0201); CT Professional Bookkeeping, TC Accounting (52.0302) VU - A.S. Business Administration (52.0201), A.S. Business Management (52.0101) IUB/K/N/S/SB – B.S. Business (52.0101) PFW – B.S. Business (52.0101) ISU – B.S. in Finance (52.0801)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 114: Student Success in Business, Humanities/ Social & Behavioral 3-4 hours
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Business***
4562.D1.1	Identify the social, legal, economic, and ethical challenges of the business environment.
4562.D1.2	Identify management and leadership functions, and the relationship to operations and supply chain management.

4562.D1.3	Relate the characteristics of organizational structures to legal forms of business ownership including small business and entrepreneurship.
4562.D1.4	Examine the principles of short- and long-range financial planning, as well as the role of the stock exchanges in the financial markets.
4562.D1.5	Analyze business issues and events related to strategic decision-making in an international and global context.
4562.D1.6	Describe the marketing mix/marketing concept and its relationship to purchasing, production, distribution, and quality.
4562.D1.7	Interpret the importance of communication and technology to the success of the organization.
4562.D1.8	List and describe the human resource functions in business.
4562.D1.9	Examine career opportunities in business.
Domain	***Business Software Applications***
4562.D2.1	Explain the purpose of information systems to support organizations and enhance productivity.
4562.D2.2	Explain the physical components and operation of microcomputers.
4562.D2.3	Use word processing, spreadsheet, database, and presentation applications to perform key business tasks.
4562.D2.4	Explain the difference between computer operating systems and user software programs.
4562.D2.5	Identify when to use appropriate features within a software application.
4562.D2.6	Utilize internet applications and “cloud” technologies in business situations.
4562.D2.7	Utilize collaboration technologies.
4562.D2.8	Explain security goals, response to threats, and safeguards.
4562.D2.9	Discuss issues related to the ethical use of information technology.
Domain	***Career Navigation***
4562.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
4562.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
4562.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
4562.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
4562.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
4562.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
4562.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
4562.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
4562.D5.1	Demonstrate computer literacy skills and basic computer functions.

4562.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
4562.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
4562.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Accounting Fundamentals		
Career Cluster	Business Management; Financial Services	
Program of Study	Finance and Investment, Accounting, Business Administration	
NLPS Sequence	B	
Course Code	4524	
Course Description	*Accounting Fundamentals introduces the language of business using Generally Accepted Accounting Principles (GAAP) and procedures for proprietorships and partnerships using double-entry accounting. Emphasis is placed on accounting principles as they relate to both manual and automated financial systems. This course involves understanding, analyzing, and recording business transactions and preparing, analyzing, and interpreting financial reports as a basis for decision-making.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9- 12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Accounting & Finance 9-12	
REPA/REPA 3	● Business 5-12	

	● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Accounting & Finance 9-12 ● CTE: Trade & Industrial: Accounting & Finance 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ACCT 101: Financial Accounting
VU Course Alignment	ACCT 100: Basic College Accounting
Four Yr. Course Alignment	ISU - BUS 201: Principles of Accounting I PNW - ACC 20000: Introductory Accounting BSU – ACC 201: Principles of Finance and Accounting
Postsecondary Credential	ITCC - CT Business Administration (52.0201), TC Business Administration (52.0201); CT Professional Bookkeeping, TC Accounting (52.0302) VU - CG Accounting (52.0305) ISU – B.S. in Finance (52.0301) PNW – B.S. Accounting (52.0101) BSU - B.A./B.S. in Accounting (52.0301)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 114: Student Success in Business, Humanities/Social & Behavioral 3-4 hours
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Financial Accounting***
4524.D1.1	Recognize the meaning and function of accounting, its importance, and basic US accounting rules and the body most responsible for their development.
4524.D1.2	Use the accounting cycle, including analyzing and recording transactions and preparing basic financial statements in accordance with accrual accounting principles.
4524.D1.3	Account for buying and selling merchandise, including using LIFO, FIFO, and weighted average to assign values to cost of goods sold and ending inventory.
4524.D1.4	Recognize the purpose, advantages, disadvantages, and limitations of internal controls. Prepare a bank reconciliation.
4524.D1.5	Account for uncollectible accounts receivable using the allowance method.
4524.D1.6	Account for notes receivable, including interest accruals.
4524.D1.7	Account for notes payable, including interest accruals. Recognize acceptable accounting for basic payroll and other short-term liabilities.
4524.D1.8	Recognize the cost of a plant asset and use accepted method(s) to depreciate a plant asset. Account for the disposal of plant assets. Recognize acceptable accounting for other non-current assets.
4524.D1.9	Calculate the present value of bonds at issuance and account for borrowing by issuing bonds.

4524.D1.10	Account for issuing common and preferred stock, treasury stock transactions, and for dividends.
4524.D1.11	Prepare a multi-step income statement and a classified balance sheet. Given cash pieces, prepare a statement of cash flows.
4524.D1.12	Analyze a set of financial statements for profitability and liquidity.

Personal Finance and Banking		
Career Cluster	Financial Services	
Program of Study	Finance and Investment	
NLPS Sequence	B	
Course Code	7150	
Course Description	*Personal Finance and Banking emphasizes management of individual financial resources for growth and maintenance of personal wealth. Covers home buying and mortgage financing, installment financing, life and health insurance, securities, commodities and other investment opportunities. Students will gain an overview of the banking industry and the financial services provided by banks for individuals and businesses.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business: Accounting & Finance	
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12	

	● Workplace Specialist: Accounting & Finance 9-12 ● CTE: Trade & Industrial: Accounting & Finance 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 108: Personal Finance
VU Course Alignment	FINC 100: Introduction to Financial Institutions* VU-EC - ECON 208: Personal Financial Management
Four Yr. Course Alignment	BSU - FIN 110: Personal Finance ISU - FIN 108: Personal Financial Management
Postsecondary Credential	VU - EC - CPC Banking (Jasper) (52.0803) ISU – B.S. Finance (51.0801) BSU - B.A./B.S. Finance (52.0801)
Liberal Arts/Sciences Requirements	VU - MATT 109: Business Mathematics
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Personal Finance***
7150.D1.1	Establish financial goals for maximizing earnings, efficient consumption, life satisfaction, reaching financial security, wealth accumulation and estate planning.
7150.D1.2	Calculate the effect of income tax on personal finance.
7150.D1.3	Demonstrate methods of personal budgeting and managing credit.
7150.D1.4	Evaluate alternative methods of meeting housing and transportation needs.
7150.D1.5	Compare, evaluate and select equity and / or income producing investments including savings accounts, stocks, bonds, and mutual funds.
7150.D1.6	Demonstrate an understanding of retirement and estate planning.
7150.D1.7	Develop a comprehensive financial plan.
Domain	***Banking***
7150.D2.1	Overview of the Banking Industry
7150.D2.2	Evaluate the impact of electronic banking on the industry
7150.D2.3	Describe common services offered by banks and other financial institutions for consumers and businesses
7150.D2.4	Analyze the competitive environment of the banking industry

Finance and Investment		
Career Cluster	Financial Services	
Program of Study	Finance and Investment	
NLPS Sequence	C	
Course Code	5258	
Course Description	*Finance and Investments addresses the need of schools in areas that have workforce demand in the finance industry. It analyzes and synthesizes high-level skills needed for a multitude of careers in the banking and investment industry. Students learn banking, investments, and other finance fundamentals and applications related to financial institutions, business and personal financial services, investment and securities, risk management products, and corporate finance.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management; Personal Finance and Banking or Accounting Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business: Accounting & Finance	
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Accounting & Finance 9-12 ● CTE: Trade & Industrial: Accounting & Finance 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	BUSN 130: Principles of Banking*, BUSN 211: Investments*	

VU Course Alignment	FINC 205: Money and Banking*, FINC 245: Introduction to Investments*
Four Yr. Course Alignment	ISU - FIN 200: Fundamentals of Finance
Postsecondary Credential	VU - CPC Banking (Jasper) (52.0803) ISU – B.S. Finance (52.0801)
Liberal Arts/Sciences Requirements	VU - MATT 109 Business Mathematics
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	**Investing**
5258.D1.1	Students evaluate the history, future, and roles of the banking industry in local, national and global economies
5258.D1.2	Describe the role of regulatory organizations, such as but not limited to the Federal Reserve System, Federal Depository Insurance Corporation (FDIC), and Office of Controller of Currency (OCC)
5258.D1.3	Analyze banking legislation that affects the operation of business firms
5258.D1.4	Evaluate how financial institutions affect personal and corporate financial planning
5258.D1.5	Explain how international monetary exchanges work
5258.D1.6	Assess the value of a country's currency on imports and exports and international travel
5258.D1.7	Explain the role of international banks in the global economy
5258.D1.8	Identify agencies that assist companies in reducing global financial risk
5258.D1.9	Describe the history and purpose of securities and securities markets.
5258.D1.10	Differentiate among stocks, bonds, and other securities
5258.D1.11	Explain the role of initial public offerings (IPOs) in raising capital for corporations
5258.D1.12	Review the use and impact of technology in the brokerage industry
5258.D1.13	Describe the role of regulatory organizations, such as but not limited to Securities and Exchange Commission, and their impact on business financing
5258.D1.14	Explain the role of stock exchanges and brokers in securities transactions
5258.D1.15	Evaluate the risks and rewards of trading
5258.D1.16	Analyze mutual funds, stocks, and bonds as an investment opportunity
5258.D1.17	Appraise the investment needs of clients, both consumers and businesses
5258.D1.18	Critique informational sources for buying/selling decisions
5258.D1.19	Identify the components and purposes of a bond table, stock table and mutual fund
5258.D1.20	Identify the components and purposes of quote found on a bond table, stock table and mutual fund
5258.D1.21	Evaluate a business plan from an investor's standpoint as an investment option
5258.D1.22	Compute the effect of the time value of money
5258.D1.23	Critique factors to consider when deciding on the form of dividend distribution
5258.D1.24	Compare and contrast the advantages and disadvantages of a cash dividend and a stock split

5258.D1.25	Generate motives for a company to repurchase stock
5258.D1.26	Evaluate a company portfolio for diversification
5258.D1.27	Examine benefits and costs of investments
5258.D1.28	Investigate employee retirement plans
5258.D1.29	Analyze the role of stockholders within a corporate structure
5258.D1.30	Evaluate the components of corporate governance
5258.D1.31	Identify the standard components of an annual report
5258.D1.32	Explain the components of a financial plan
5258.D1.33	Examine and assess strategies for effective debt management by individuals and corporations through either short-term or long-term financing options
5258.D1.34	Identify steps to be used by financial planners for developing a personal budget

Finance and Investment Capstone		
Career Cluster	Financial Services	
Program of Study	Finance and Investment	
NLPS Sequence	D	
Course Code	7265	
Course Description	*The Finance and Investment Capstone course would include content on Credit and Collections, Real Estate, Business Law and possibly Accounting.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management; Personal Finance and Banking or Accounting Fundamentals; Finance and Investment	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a quantitative reasoning course for CORE 40 diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business: Accounting & Finance	

REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Accounting & Finance 9-12 ● CTE: Trade & Industrial: Accounting & Finance 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	BLAW 203: Legal Environment of Business*, FINC 220: Credit and Collections*, FINC 230: Real Estate Finance*
Four Yr. Course Alignment	
Postsecondary Credential	VU - CPC Banking (Jasper) (52.0803)
Liberal Arts/Sciences Requirements	VU MATT 109 Business Mathematics
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Business Law***
7265.D1.1	Discuss state and federal judicial systems and jurisdictions.
7265.D1.2	Identify the sources of laws as applied to business.
7265.D1.3	Apply appropriate legal principles to contractual obligations.
7265.D1.4	Understand the parameters of the various business structures.
7265.D1.5	Apply the laws of agency and debt adjustment to factual situations.
7265.D1.6	Recognize the obligations and rights of parties to negotiate instruments.
7265.D1.7	Recognize the rights and obligations of parties as regards personal and real property.
7265.D1.8	Recognize the rights and obligations of the parties to sales and lease of goods contracts.
7265.D1.9	Apply the Uniform Commercial Code to sales contracts and differentiate common law and Uniform Commercial Code situations.
7265.D1.10	Understand the application of consumer protection laws.
7265.D1.11	Recognize the importance of both Federal and State employment laws to effective organizational leadership.
7265.D1.12	Understand the importance of protecting intellectual property rights.
Domains	***Investments***
7265.D2.1	Describe the impact of gift tax on a person ‘s income
7265.D2.2	Evaluate the concepts of risk management

7265.D2.3	Analyze the elements of the insurance industry
7265.D2.4	Examine the process of underwriting an insurance policy
7265.D2.5	Assess liability insurance for individuals and business
7265.D2.6	Evaluate automobile insurance
7265.D2.7	Evaluate personal and commercial property insurance
7265.D2.8	Analyze components of health and long-term care insurance
7265.D2.9	Analyze government supported health insurance programs
7265.D2.10	Assess government supported employment insurance programs
7265.D2.11	Differentiate among components of life insurance
7265.D2.12	Explain qualifications needed by an individual or business firm to obtain credit
7265.D2.13	Compare and contrast terms and conditions of various sources of credit
7265.D2.14	Assess and recommend credit options available for financial plans
7265.D2.15	Evaluate the implications of bankruptcy for consumers and for businesses
7265.D2.16	Analyze the impact of economic conditions on financial plans
7265.D2.17	Identify tax planning strategies that may be recommended by financial planners
7265.D2.18	Develop, analyze and update a financial plan for an individual and/or company
7265.D2.19	Distinguish among trust services provided for individuals and corporations
7265.D2.20	Compare and contrast investment options for a monetary inheritance
7265.D2.21	Evaluate types and purposes of estate planning tools
7265.D2.22	Define and analyze tax planning strategies for long-term financial assets

Financial Services Insurance							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
4562	Principles of Business Management	7149	Insurance Fundamentals	7151	Personal and Commercial Insurance	7201	Small Business Operations Capstone

Principles of Business Management		
Career Cluster	Business Management; Financial Services; Marketing, Sales, & Entrepreneurship; Supply Chain & Transportation	
Program of Study	Accounting, Business Administration, Finance and Investment, Insurance, Marketing and Sales, Supply Chain and Logistics	
NLPS Sequence	A	
Course Code	4562	
Course Description	*Principles of Business Management examines business ownership, organization principles and problems, management, control facilities, administration, financial management, and development practices of business enterprises. This course will also emphasize the identification and practice of the appropriate use of technology to communicate and solve business problems and aid in decision making. Attention will be given to developing business communication, problem-solving, and decision-making skills using spreadsheets, word processing, data management, and presentation software.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	

Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTEpathway
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 101: Introduction to Business, OTEC 207: Integrated Microsoft Office Applications or OTEC 101: Introduction to Microcomputers
VU Course Alignment	MGMT 100: Introduction to Business, COMP 110: Introduction to Computer Concepts
Four Yr. Course Alignment	BSU – ISOM 125: Introduction to Business Computer Applications ISU - BUS 100: Introduction to Contemporary Business, BUS 180: Business Information Tools IUB - BUS X-100: Introduction to Business IUN/S/K/N - BUS W-100: Introduction to Business IUSB - BUS B-190: Introduction to Business PFW - BUS 10001: Principles of Business Administration PNW - BUSM 10100: Introduction to Business USI - MNGT 201: Survey of Management
Postsecondary Credential	ITCC - CT Business Administration, TC Business Administration (52.0201) VU - A.S. Business Administration (52.0201), A.S. Business Management (52.0101) IUB/K/N/S/SB – B.S. Business (52.0101) PFW – B.S. Business (52.0101)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 114: Student Success in Business, Humanities/ Social & Behavioral 3-4 hours
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Business***
4562.D1.1	Identify the social, legal, economic, and ethical challenges of the business environment.
4562.D1.2	Identify management and leadership functions, and the relationship to operations and supply chain management.
4562.D1.3	Relate the characteristics of organizational structures to legal forms of business ownership including small business and entrepreneurship.
4562.D1.4	Examine the principles of short- and long-range financial planning, as well as the role of stock exchanges in the financial markets.

4562.D1.5	Analyze business issues and events related to strategic decision-making in an international and global context.
4562.D1.6	Describe the marketing mix/marketing concept and its relationship to purchasing, production, distribution, and quality.
4562.D1.7	Interpret the importance of communication and technology to the success of the organization.
4562.D1.8	List and describe the human resource functions in business.
4562.D1.9	Examine career opportunities in business.
Domain	***Business Software Applications***
4562.D2.1	Explain the purpose of information systems to support organizations and enhance productivity.
4562.D2.2	Explain the physical components and operation of microcomputers.
4562.D2.3	Use word processing, spreadsheet, database, and presentation applications to perform key business tasks.
4562.D2.4	Explain the difference between computer operating systems and user software programs.
4562.D2.5	Identify when to use appropriate features within a software application.
4562.D2.6	Utilize internet applications and “cloud” technologies in business situations.
4562.D2.7	Utilize collaboration technologies.
4562.D2.8	Explain security goals, response to threats, and safeguards.
4562.D2.9	Discuss issues related to the ethical use of information technology.
Domain	***Career Navigation***
4562.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
4562.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
4562.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
4562.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
4562.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
4562.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
4562.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
4562.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
4562.D5.1	Demonstrate computer literacy skills and basic computer functions.
4562.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
4562.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.

4562.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Insurance Fundamentals		
Career Cluster	Financial Services	
Program of Study	Insurance	
NLPS Sequence	B	
Course Code	7149	
Course Description	*Insurance Fundamentals presents an introduction to professions within the insurance industry. The course includes an overview of the insurance industry, types of coverage that exist, insurance processes and expected outcomes. Students will also gain an understanding of the selling process including the psychology of selling and will develop skills through a series of selling situations.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business: Accounting & Finance	
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Accounting & Finance 9-12 ● CTE: Trade & Industrial: Accounting & Finance 5-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 160: Introduction to Insurance, MKTG 102: Principles of Selling
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT Insurance (52.1701)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Insurance***
7149.D1.1	Identify the steps in the risk management process
7149.D1.2	Report an understanding of the history of the insurance industry to include how it started, its evolution, and where it stands today.
7149.D1.3	Discuss the insurance industry regulating agencies that currently exist.
7149.D1.4	Describe the occupations available and requirements for employment in the insurance industry and its varied occupations.
7149.D1.5	List the types of insurance coverage.
7149.D1.6	Compare and contrast the type of medical insurance available including medical (including short term medical), vision, and dental.
7149.D1.7	Discuss the types of life insurance and purchase decisions.
7149.D1.8	Differentiate between property and casualty insurance and types.
7149.D1.9	Describe the uses of commercial insurance.
7149.D1.10	Compare marketing responsibilities at the corporate, regional and agent levels.
7149.D1.11	Use examples to discuss the process of selling by agents.
7149.D1.12	Describe and explain the four essential elements of any enforceable contract.
7149.D1.13	Identify the basic parts of an insurance contract.
7149.D1.14	Define and explain the elements of negligence
7149.D1.15	Describe application and underwriting process
Domain	***Selling***
7149.D2.1	Discuss the relationship between personal selling and the marketing concept/marketing mix.
7149.D2.2	List the characteristics of industrial buying behavior and consumer buying behavior.
7149.D2.3	List or state personal attributes and performance characteristics of a successful salesperson.
7149.D2.4	Understand and utilize varieties of communication forms to adapt to the buyer/ seller relationship.

7149.D2.5	Analyze the importance of knowledge of the company, the competition, and the product and its impact on selling activities.
7149.D2.6	Assess the stages of the selling process.
7149.D2.7	Discuss managerial concerns that affect salesperson performance appraisals.
7149.D2.8	Design, Explain, and deliver a prepared tailored presentation.

Personal and Commercial Insurance		
Career Cluster	Financial Services	
Program of Study	Insurance	
NLPS Sequence	C	
Course Code	7151	
Course Description	*Personal and Commercial Insurance provides an understanding of the basic principles of personal and property and liability insurance. Students will analyze personal loss exposures and insurance including homeowners and other dwelling coverages, personal liability, inland marine, auto, life, health insurance, and financial planning. Students will also explore commercial coverages including general liability and workers compensation.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management; Insurance Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist: Business: Accounting & Finance	
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12	

	● Workplace Specialist: Accounting & Finance 9-12 ● CTE: Trade & Industrial: Accounting & Finance 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 262: Personal Insurance, BUSN 264: Commercial Insurance
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT Insurance (52.1701)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Personal Insurance***
7151.D1.1	Describe and analyze the property loss exposures that individuals and families might face regarding the property exposed to loss and the causes of loss affecting property, and the financial consequences of property losses.
7151.D1.2	Describe and analyze the liability loss exposures that individuals and families might face regarding the possibility of a claim for money damages and the financial consequences of liability losses.
7151.D1.3	Describe and analyze the risk management process that can be used by individuals and families regarding the steps in the risk management process, insurance as a risk management technique, and other techniques to treat loss exposures.
7151.D1.4	Describe the various problems associated with automobile insurance which include the high frequency of automobile accidents, the high costs of automobile accidents. The substantial underwriting losses incurred by insurers, irresponsible drivers, and the availability and affordability of automobile insurance.
7151.D1.5	Describe, analyze, and explain the major functions of the personal auto policy which include personal automobile insurance and personal loss exposures, liability coverage, medical payment coverage, and the uninsured motorist's coverage.
7151.D1.6	Describe, analyze, and explain the major functions of the personal auto policy which include physical damage insurance for the damage or theft of a covered auto, the duties imposed on an insured after an accident or loss, bankruptcy of the insured, changes in the policy, fraud, legal action against the insurer, and the various endorsements that can be added to the personal auto policy.
7151.D1.7	Describe and explain the homeowner's policy series which includes the homeowner's declarations, insuring agreement, definitions, and Section I of the HO-3 policy.
Domain	***Commercial Insurance***

7151.D2.1	Demonstrate knowledge of commercial loss exposures, the risk management process, and the basic nature of the various lines of insurance.
7151.D2.2	Explain the advantages of package policies, describe the components for a commercial package policy, and explain how the excess and surplus (E&S) market provides coverage for many unique exposures.
7151.D2.3	Demonstrate knowledge of the various documents that form the commercial property coverage part, the coverages and conditions included in the building and personal property coverage form, methods for insuring fluctuating values, and the difference between blanket and specific insurance.
7151.D2.4	Distinguish between the four causes-of-loss forms and describe and discuss the nine conditions in the commercial property conditions form.
7151.D2.5	Describe the factors and approaches used in rating commercial property coverage.
7151.D2.6	Demonstrate uses of the business income loss exposure, the business income coverage forms, various business income endorsements, and how business income is rated.
7151.D2.7	Describe the various crime coverage forms as well as the boiler and machinery coverage form and demonstrate knowledge of loss exposures involved in both crime and boiler and machinery coverages.
7151.D2.8	Describe and explain inland and ocean marine exposures, the types of coverage provided by various field and non-filed inland marine policies, and the basic types of ocean marine insurance coverages.
7151.D2.9	Describe various liability loss exposures and the coverages included in and excluded from Coverages A, B, and C of the commercial general liability (CGL) coverage form.
7151.D2.10	Describe and discuss the types of persons and organizations covered under a CGL policy; the application of limits, aggregate limits, and sub limits in commercial general liability policies; CGL conditions, endorsements, and rating; the difference between the claims-made version of the CGL and the occurrence version; and miscellaneous liability coverage forms.
7151.D2.11	Describe the coverages provided by the business auto coverage form, the garage coverage form, and the motor carrier coverage form, including endorsements.
7151.D2.12	Demonstrate knowledge of the coverages provided by the Insurance Service Office (ISO) property and liability forms.
7151.D2.13	Discuss and describe workers compensations laws, including requirements for benefits, benefits typically provided, persons and employments covered, and methods for meeting employer's obligations; the workers compensation and employers' liability policy and endorsements; and the procedures for rating workers compensation insurance, including merit rating plans.
7151.D2.14	Describe various types of professional liability policies, excess and umbrella liability policies, surety bonds, and miscellaneous policies.

Small Business Operations Capstone	
Career Cluster	Financial Services; Marketing, Sales, & Entrepreneurship
Program of Study	Entrepreneurship; Insurance; Marketing and Sales
NLPS Sequence	D

Course Code	7201	
Course Description	*The Business Management Capstone is designed to provide any student with the Business Management skills necessary to run their own business or to serve in upper level management. Students will explore Management Theory, Accounting, and Business Law. The Business Management Capstone can be used with any career pathway except Business Administration. Completion of the course may allow students the opportunity to earn a CT or TC through ITCC.*	
Prerequisite(s)/ Corequisite(s)	Any CTE Business Concentrator Sequence except Business Administration	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward		
Dual Credit Status	X (PCL/CTE)	
Additional Notes	Recommended Capstone course for Entrepreneurship, Insurance, and Marketing Programs of Study	
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	BUSN 105: Principles of Management, BUSN 201: Business Law, ACCT 101: Financial Accounting, ENTR 220: Small Business Operations	
VU Course Alignment	MGMT 250: Introduction to Management	
Four Yr. Course Alignment		

Postsecondary Credential	VU – A.S. Business Administration (52.0201), A.S. Business Management (52.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Management***
7201.D1.1	Define management, managers, and the basic management functions.
7201.D1.2	Evaluate classical, behavioral, quantitative, and contemporary management theories regarding process, motivation, and expected outcomes. Distinguish between the external, task, and internal environments of organizations.
7201.D1.3	Discuss social responsibility, the meaning of ethics in the business setting, and the social audit.
7201.D1.4	Assess the roles of goals and goal setting in the planning process and identify barriers that may interfere with goal setting.
7201.D1.5	Appraise the strategic planning process and the process of strategy implementation.
7201.D1.6	Structure and support the steps in the decision-making process.
7201.D1.7	Identify and describe the major purposes for and types of forecasting techniques.
7201.D1.8	Discuss the nature of work specialization, departmentalization, and scheduling within the scope of management.
7201.D1.9	Discuss how organizational activities are coordinated and describe the management of organizational conflict.
7201.D1.10	Appraise international business practices and evaluate against cultural and political values.
Domain	***Business Law***
7201.D2.1	Discuss state and federal judicial systems and jurisdictions.
7201.D2.2	Identify the sources of laws as applied to business.
7201.D2.3	Apply appropriate legal principles to contractual obligations.
7201.D2.4	Understand the parameters of the various business structures.
7201.D2.5	Apply the laws of agency and debt adjustment to factual situations.
7201.D2.6	Recognize the obligations and rights of parties to negotiate instruments.
7201.D2.7	Recognize the rights and obligations of parties as regards personal and real property.
7201.D2.8	Recognize the rights and obligations of the parties to sales and lease of goods contracts.
7201.D2.9	Apply the Uniform Commercial Code to sales contracts and differentiate common law and Uniform Commercial Code situations.
7201.D2.10	Understand the application of consumer protection laws.
7201.D2.11	Recognize the importance of both Federal and State employment laws to effective organizational leadership.
7201.D2.12	Understand the importance of protecting intellectual property rights.
Domain	***Accounting***

7201.D3.1	Recognize the meaning and function of accounting, its importance, and basic US accounting rules and the body most responsible for their development.
7201.D3.2	Use the accounting cycle, including analyzing and recording transactions and preparing basic financial statements in accordance with accrual accounting principles.
7201.D3.3	Account for buying and selling merchandise, including using LIFO, FIFO, and weighted average to assign values to cost of goods sold and ending inventory.
7201.D3.4	Recognize the purpose, advantages, disadvantages, and limitations of internal controls. Prepare a bank reconciliation.
7201.D3.5	Account for uncollectible accounts receivable using the allowance method.
7201.D3.6	Account for notes receivable, including interest accruals.
7201.D3.7	Account for notes payable, including interest accruals. Recognize acceptable accounting for basic payroll and other short-term liabilities.
7201.D3.8	Recognize the cost of a plant asset and use accepted method(s) to depreciate a plant asset. Account for the disposal of plant assets. Recognize acceptable accounting for other non-current assets.
7201.D3.9	Calculate the present value of bonds at issuance and account for borrowing by issuing bonds.
7201.D3.10	Account for issuing common and preferred stock, treasury stock transactions, and for dividends.
7201.D3.11	Prepare a multi-step income statement and a classified balance sheet. Given cash pieces, prepare a statement of cash flows
7201.D3.12	Analyze a set of financial statements for profitability and liquidity.
7201.D3.13	Communicate effectively both orally and in writing, using professional, business English.
Domain	***Small Business Operations***
7201.D4.1	Create a growth and development action plan for a launched business.
7201.D4.2	Apply asset management principles and compare and contrast the different asset classes and their functions as wealth management tools.
7201.D4.3	Examine the basic methods of business valuation
7201.D4.4	Explore strategies for effective human resource recruitment and management.
7201.D4.5	Evaluate strategies for financing a growing firm.
7201.D4.6	Apply the calculations, withholding requirements, payments, and filing requirements related to payroll taxes.
7201.D4.7	Assess which income tax returns apply to different business entities at the federal, state, and local levels and explain the information needed for each.
7201.D4.8	Build the organizational structure and personnel function related to the entrepreneurial firm.

Health & Human Services

Introduction to Health Science Careers		
Career Cluster	Health & Human Services	
Program of Study		
NLPS Sequence	Introductory Course	
Course Code	5272	
Course Description	*Introduction to Health Science Careers is an exploratory course designed to provide students with an opportunity to investigate all aspects of the health science industry. Students will receive an introduction to healthcare systems and examine a variety of pathways in health science, and reflect on their own knowledge, skills, and interests, to begin to narrow the areas within health science they want to continue exploring, in preparation for further study in a health science principles course.*	
Prerequisite(s)/ Corequisite(s)	None Recommended: Preparing for College and Careers	
Credits	1 or 2 semester course, 1 credit per semester, maximum of 2 credits	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status		
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma **Note**: This course qualifies for funding at the 8th grade level	
ADDITIONAL COURSE INFO		
Funding	Introductory	Available for 8th grade
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Workplace Specialist: Dental Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12 ● Workplace Specialist: Dental Careers 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
5272.D11.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
5272.D11.2	Explain the benefits and responsibilities of being a member of a CTSO.
5272.D11.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5272.D11.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
5272.D12.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
5272.D12.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster
5272.D12.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
5272.D12.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society
5272.D12.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest
5272.D12.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
5272.D12.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster
Domain	***Human Anatomy and Physiology (Academic Foundation)***
5272.D1.1	Describe the organization of the human body and directional terms A. Levels of organization – cellular, chemical, organ, organism, system, tissue B. Demonstrate anatomical position

	C. Use directional terms – anterior/posterior, cephalic/caudal, medial/lateral, proximal/distal, superficial/deep, superior/inferior, ventral/dorsal D. Identify body cavities – abdominal, cranial, dorsal, nasal, oral, orbital, pelvic, spinal, thoracic
5272.D1.2	Identify basic structures and describe functions of human body systems A. Structures of the skeletal system – Distinguish between axial and appendicular skeletons, identify joint types and movement, name and classify bones (206) B. Functions of the skeletal system – hematopoiesis, mineral storage, muscle attachment and movement, ossification, structure, and support C. Structures of the muscular system – identify major muscle groups of neck, shoulder, chest, abdomen, back, arms, and legs D. Functions of the muscular system – body movement, posture, protection E. Structures of the integumentary system – label the layers of skin F. Functions of the integumentary system – infection protection, sensory organ, temperature regulation, UV light protection, vitamin D production
Domain	***Diseases and Disorders (Academic Foundation)***
5272.D2.1	Describe diagnosis, treatment, and prevention of common diseases and disorders such as anxiety, arthritis, asthma, cancer, cataracts, concussion/Traumatic Brain Injury (TBI), dementia, depression, diabetes, hypertension, melanoma, stroke
5272.D2.2	Describe biomedical therapies as the relate to the prevention, pathology, and treatment of disease – gene editing, gene testing, gene therapy, immunizations, immunotherapy, stem cell research
Domain	***Medical Mathematics (Academic Foundation)***
5272.D3.1	Demonstrate competency using basic math skills and mathematical conversions as they relate to healthcare A. Metric system: Centi-, Deci-, Kilo-, Milli-, Micro- B. Mathematical – Addition/subtraction, average, fractions, multiplication/division, percentages, ratios C. Conversions – Height (inches/meters), Length (inches/meters), Temperature (F/C), Volume (ml/cc), Weight/mass (pounds/grams)
5272.D3.2	Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results
5272.D3.3	Demonstrate use of the 24-hour clock/military time
Domain	***Effective Communication***
5272.D4.1	Demonstrate methods of delivering and obtaining information, while communicating effectively A. Verbal and nonverbal therapeutic communication – active listening, reflecting, silence, summarizing B. Common barriers to communication -Physical disabilities – aphasia, developmental level, hearing loss, impaired vision -psychological barriers – attitudes, bias, prejudice, stereotyping -language barriers
5272.D4.2	Distinguish between subjective and objective information

5272.D4.3	Interpret elements of the communication process using sender-message-receiver feedback model
5272.D4.4	Modify communication to meet the needs of the patient/client and to be appropriate to the situation
5272.D4.5	Describe appropriate interactions with patients throughout various stages of psychosocial development
5272.D4.6	Use common roots, prefixes, and suffixes to communicate information
5272.D4.7	Interpret common medical abbreviations to communicate information
5272.D4.8	Use proper elements of written and electronic communication (spelling, grammar, and formatting)
5272.D4.9	Prepare examples of technical and informative writing
5272.D4.10	Demonstrate appropriate use of digital communications in a work environment, such as email, text, and social media
Domain	***Healthcare Systems***
5272.D5.1	Differentiate healthcare delivery systems and healthcare related agencies A. Types of practice settings – acute care, ambulatory care, behavior and mental health services, home care, long-term care, medical and dental practices B. Specialty medical and dental practices – cosmetic surgery, orthodontics, pulmonology, surgical C. Government agencies – Centers for Disease Control and Prevention (CDC), Centers for Medicare & Medicaid Services (CMS), National Institutes of Health (NIH), Occupational Safety and Health Administration (OSHA), U.S. Department of Veterans Affairs (VA), U.S. Food and Drug Administration (FDA), U.S. Public Health Service (USPHS) D. Related organizations – American Cancer Society (ACS), American Heart Association (AHA), American Red Cross (ARC), March of Dimes, World Health Organization (WHO)
5272.D5.2	Examine the healthcare consumer's rights and responsibilities within the healthcare system – Compliance, Patient's Bill of Rights, Self-advocacy
5272.D5.3	Analyze the impact of emerging issues on healthcare delivery systems – Behavior/mental health, bioethics, epidemiology, socioeconomics, technology
5272.D5.4	Analyze healthcare economics and related items – the history and role of health insurance and employer/employee benefits, fundamental terms related to health insurance, types of insurance plans
Domain	***Safety Practices***
5272.D6.1	Identify existing and potential hazards to clients, co-workers, and self
5272.D6.2	Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness A. Identify classifications of pathogens – bacteria, fungi, parasites, protozoa, issues B. Describe characteristics of microorganisms – aerobic, anaerobic, non-pathogenic, pathogenic C. Recognize chain infection D. Describe mode of transmission – common vehicle (air, food, water), direct, healthcare-associated infections (nosocomial), indirect, opportunistic, vectors

	E. Differentiate methods of controlling the spread and growth of pathogens – -Asepsis – antisepsis, disinfection, sanitization, sterile technique, sterilization -Standard precautions – environmental cleaning, gloving, handwashing, Personal Protective Equipment (PPE) -Isolation precautions – transmission-based contact -Bloodborne pathogen precautions -Vaccinations
5272.D6.3	Apply personal safety procedures based on Occupational Safety and Health Administration (OSHA) and Centers for Disease Control (CDC) regulations
5272.D6.4	Demonstrate and apply the use of Personal Protective Equipment (PPE)
5272.D6.5	Comply with safety signs, symbols, and labels
Domain	***Healthcare Teamwork***
5272.D7.1	Evaluate roles and responsibilities of healthcare team members
5272.D7.2	Recognize methods of building positive team relationships
5272.D7.3	Evaluate why teamwork is an important part of healthcare and how it improves patient care
Domain	***Health Maintenance Practices***
5272.D8.1	Differentiate between wellness and disease
5272.D8.2	Promote disease prevention and model health behaviors A. Promote self-care behaviors of health and wellness – exercise, nutrition, relationships, sleep habits, stress management B. Examine various aspects of behavioral health – anxiety, depressions, substance abuse, suicide C. Describe public health strategies for prevention of disease – community health education outreach programs; immunizations; medical, dental, and mental health screenings; routine physical exams; self-care behaviors
5272.D8.3	Discuss physical, mental, social, and behavioral development and its impact on healthcare across the lifespan
5272.D8.4	Identify socioeconomic determinants of health and wellness
Domain	***Technical Skills***
5272.D9.1	Demonstrate procedures for measuring and recording vital signs in both normal and abnormal ranges including but not limited to – blood pressure, height and weight, oxygen saturation, pain, pulse, respirations, temperature
Domain	***Information Technology in Healthcare***
5272.D10.1	Identify components of an electronic health record (EHR) and/or electronic medical record (EMR) – diagnostic tests, history and physical, medications, patient demographics, progress notes, treatment plan
5272.D10.2	Explore different types of health data collection tools – medical wearable devices, patient monitoring equipment, phone apps
5272.D10.3	Create electronic documentation that reflects timeliness, completeness, and accuracy
5272.D10.4	Examine information systems policies, procedures, and regulations as required by nationals, state, and local entities – facility policies, HIPAA, medical coding, social media

Health Science Education: Special Topics		
Career Cluster	Health & Human Services	
Program of Study		
NLPS Sequence		
Course Code	5286	
Course Description	*Health Science Education: Special Topics is an extended laboratory experience designed to address the advancement and specialization of healthcare careers through the provision of a specialized course for a specific healthcare workforce need in the school's region. Practicum is at a qualified clinical site, and is designed to give the student the opportunity to practice technical skills previously learned in the classroom while working under the direction of an appropriately licensed healthcare professional. Throughout the course students will focus on learning about the healthcare system and employment opportunities at a variety of entry levels, an overview of the healthcare delivery systems, healthcare teams, and legal and ethical considerations, and obtaining the knowledge, skills, and attitudes essential for providing basic care in a variety of healthcare settings. Additionally, students will build their essential job related skills for providing basic care appropriate for their healthcare setting and audience. Course standards and curriculum must be tailored to the specific healthcare profession, preparing students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. This course also provides students with the knowledge, attitudes, and skills needed to make the transition from high school to postsecondary opportunities, and to work in a variety of health science careers. Students are encouraged to focus on self-analysis to aid in their career selection. Job seeking and job maintenance skills, personal management skills, and completion of the application process for admission into a postsecondary program are also areas of focus. Participation in HOSA encourages the development of leadership, communication and career related skills, and opportunities for community service.*	
Prerequisite(s)/ Corequisite(s)	None Recommended: CTE courses that would help prepare the student for success in this area	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, maximum of 6 credits	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X	
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE funding.	
ADDITIONAL COURSE INFO		
Funding	Pilot	
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting	

	● Workplace Specialist: Health Careers ● Workplace Specialist: Dental Careers
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12 ● Workplace Specialist: Dental Careers 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Advanced Career & Technical Education, College Credit: Health and Human Services	
Career Cluster	Health & Human Services
Program of Study	
NLPS Sequence	
Course Code	6138
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited postsecondary institution through an adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint program of study involving a postsecondary partnership.*
Prerequisite(s)/ Corequisite(s)	None Recommended: CTE courses that would help prepare the student for success in this area
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up

	to 12 credits
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● No License Available
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Workplace Specialist: Dental Careers
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12 ● Workplace Specialist: Dental Careers 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Health & Human Services Biomedical Sciences and Technology							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
5218	Principles of Biomedical Sciences	5216	Human Body Systems	5217	Medical Interventions	5219	Biomedical Innovations
		5276	Anatomy and Physiology			7255	Healthcare Specialist Capstone

Principles of Biomedical Sciences	
Career Cluster	Health & Human Services
Program of Study	Biomedical Sciences and Technology
NLPS Sequence	A
Course Code	5218
Course Description	*Principles of Biomedical Sciences provides an introduction to this field through "hands-on" projects and problems. Student work involves the study of human medicine, research processes, and an introduction to bioinformatics. Students investigate the human body systems and various health conditions including heart disease, diabetes, hypercholesterolemia, and infectious diseases. A theme through the course is determining factors that led to the death of a fictional person. After determining the factors responsible for the death, the students investigate lifestyle choices and medical treatments that might have prolonged the person's life. Key biological concepts included in the curriculum are: homeostasis, metabolism, inheritance of traits, feedback systems, and defense against disease. Engineering principles such as the design process, feedback loops, fluid dynamics, and the relationship of structure to function will be included where appropriate. The course is designed to provide an overview of all courses in the Biomedical Sciences program and to lay the scientific foundation necessary for student success in the subsequent courses.* ***NOTE:*** *This course aligns with the PLTW Principles of Biomedical Sciences curriculum. Use of the PLTW Curriculum may require additional training and membership in the PLTW network.*
Prerequisite(s)/ Corequisite(s)	Biology I or concurrent enrollment in Biology I is required
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas Fulfills a science requirement for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License9-12 ● Any Occupational Specialist I, II or III in Health Occupation: ● Biology 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Life Science with high school setting	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Science license 9-12 ● Life Science 5-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Human Body Systems***
5218.D1.1	Students investigate the six major human body systems. Students explore what it means to be a system, relate principles of engineering to systems, and investigate the interrelatedness of human body systems. Students learn about the role of medical examination in determining unknown causes of death.
5218.D1.2	Identify the six major human body systems and their functions. Understand that these systems work together to maintain good health.
5218.D1.3	Identify and locate specific organs that comprise the six major human body systems. Describe the function of each organ.
5218.D1.4	Recognize that organs are composed of specific types of tissues, which are composed of specific cells that operate both independently and interdependently of each other. Know that these cells are the fundamental functional units within all living organisms.
5218.D1.5	Define the terms mechanical engineering, bioengineering, fluid mechanics and materials

	science. Describe how these fields of engineering apply to human body systems.
5218.D1.6	Demonstrate how parts of human body systems work together to perform the job of the entire system.
5218.D1.7	Identify diseases and conditions that can disrupt the functioning of cells, tissues and organs within a human body system. Understand that evidence can be seen post- mortem through medical examination.
5218.D1.8	Describe the aspects involved in determining cause of death, including the medical condition of a victim, in---depth scientific research, the use of medical technology and the involvement of multiple medical professionals.
5218.D1.9	Discuss the role of a coroner, a medical examiner, and an emergency medical technician in determining the cause of a death.
Domain	***Heart Attack***
5218.D2.1	Students focus on the circulatory system and its role in maintaining homeostasis by examining the structure and function of the heart. Students are introduced to experimental design and software (i.e., EKG, stress test) to collect and analyze heart data including heart rate, blood pressure and heart function.
5218.D2.2	Describe the characteristics of a simple pump.
5218.D2.3	Demonstrate how a two---chambered pump works.
5218.D2.4	Recognize that the human heart is a four---chambered living pump that provides the force needed to transport blood throughout the body.
5218.D2.5	Identify the structures and functions of the heart.
5218.D2.6	Compare and contrast the characteristics and functions of the different cardiac tissue types including striated muscle tissue, veins, arteries, and capillaries.
5218.D2.7	Describe how the heart operates using basic principles of engineering, such as those found in fluid mechanics.
5218.D2.8	Explain how heartbeat is caused by the contraction of cardiac muscle cells because of electrical activity signaled by the autonomic nervous system. Describe how this results in the movement of blood from the heart to the arteries and the rest of the body.
5218.D2.9	Calculate heart rate as the number of heart contractions per unit of time (usually one minute). Recognize that heart rate is used by physicians as one indicator of a person's medical condition.
5218.D2.10	Describe blood pressure as a measure of the force put on the vascular walls by the blood as it is pushed by the cardiac muscles through the vascular system. Recognize that this is one indicator of the overall medical condition of the cardiovascular system.
5218.D2.11	Investigate the internal and external factors that can impact heart function including heart rate and blood pressure. Use experimental design to create and carry out experiments on blood pressure and heart rate.
5218.D2.12	Demonstrate the importance of technology in the biomedical sciences by using software and equipment to collect and analyze cardiovascular data.
5218.D2.13	Recognize that blood is a liquid connective tissue composed of red cells, white cells and platelets suspended in liquid plasma.

5218.D2.14	Recognize that blood is the major transport mechanism for substances that must be distributed throughout the body and must be replenished throughout life.
5218.D2.15	Describe the functions of red cells, white cells, and platelets.
5218.D2.16	Use experimental procedures to investigate and explain the limits of the size of cells.
Domain	***Diabetes***
5218.D3.1	Students investigate how a disease (diabetes) in one system can have serious effects on homeostasis throughout the body. Students are introduced to basic chemistry, the biochemistry of macromolecules, and the relationship of these molecules to metabolic function. The causes, symptoms, treatments, and effects of diabetes are studied as well as the lifestyle implications associated with this disease. Students discuss engineering principles involved in feedback loops as related to insulin and glucose.
5218.D3.2	Recognize that the cells in living tissue are composed of molecules. Build and analyze models for molecules, simple compounds, and macromolecules.
5218.D3.3	Explain that food is composed of molecules and compounds. Describe how energy is stored and released in chemical bonds of molecules and compounds.
5218.D3.4	Distinguish among the structures and functions of carbohydrates, proteins, and lipids. Provide evidence that these organic molecules come from food (i.e., recommended daily allowance on food labels, chemical indicators).
5218.D3.5	Describe how homeostasis depends upon many different chemical reactions and large organic molecules.
5218.D3.6	Recognize that enzymes are proteins that regulate reaction rates and that many metabolic processes depend upon enzymes to function properly. Explain the importance of enzymes maintaining homeostasis in the human body.
5218.D3.7	Demonstrate that enzymes are highly specific, using both lock and key models and induced fit models of enzyme function.
5218.D3.8	Recognize that many systems, living or non-living, operate using feedback mechanisms and that information put into a system causes a reaction within the system. Explain the difference between negative and positive feedback.
5218.D3.9	Describe how Insulin regulates the transfer of glucose into cells.
5218.D3.10	Explain the cause, symptoms, effects and treatments of both Type I and Type II diabetes.
5218.D3.11	Demonstrate an understanding of the dietary requirements and restrictions of people who have diabetes and the ways in which diabetes can impact one's daily life.
5218.D3.12	Describe behaviors that could help prevent the onset of Type II diabetes.
5218.D3.13	Describe the four main areas of diabetes research: new technology in equipment, stem cell research, improved drug therapy and organ transplants.
Domain	***Sickle Cell Disease***
5218.D4.1	Students investigate sickle cell disease to learn the principles of genetics. Students are introduced to bioinformatics and build models of DNA and the beta-globin protein as they study the structure and function of and the relationship between nucleic acids and proteins. To study the impact of mutations, students analyze karyograms and explore the effects of single base-pair mutations.

5218.D4.2	Describe the structure and role of hemoglobin in red blood cells.
5218.D4.3	Recognize that changes to the structure of a protein can change its ability to function properly. Describe how changes in the structure of hemoglobin can result in structural changes in red blood cells.
5218.D4.4	Distinguish between normal and sickle red blood cells.
5218.D4.5	Summarize the symptoms and complications of sickle cell disease.
5218.D4.6	Describe the structure and function of deoxyribonucleic acid (DNA).
5218.D4.7	Explain the structure and function of genes by identifying the exons and introns.
5218.D4.8	Demonstrate how the genetic information in DNA molecules provides instructions for assembling protein molecules and that this is virtually the same mechanism for all life forms.
5218.D4.9	Distinguish among the multiple structural levels of proteins. Understand that a protein's shape is not constant; it changes depending on its environment.
5218.D4.10	Illustrate how the sequence of amino acids in a protein determines the protein's structure.
5218.D4.11	Understand that chromosomes carry numerous genes that are passed from parents to offspring in the reproductive cells.
5218.D4.12	Identify some chromosomal abnormalities and describe the syndromes associated with them.
5218.D4.13	Distinguish between chromosomal and gene mutations.
5218.D4.14	Describe the possible outcomes of different types of gene mutations and the corresponding effects on the properties of the resulting protein.
5218.D4.15	Compare the symptoms and complications of sickle cell trait to sickle cell disease.
5218.D4.16	Explain the relationship between the symptoms of anemia and cell energetics.
5218.D4.17	Identify countries with higher incidences of sickle cell disease and investigate the reasons for these occurrences.
5218.D4.18	Create and analyze pedigree charts to illustrate passage of a trait through at least three generations. Calculate the probability of a trait appearing in offspring.
Domain	***Hypercholesterolemia***
5218.D5.1	Students look at the function of cholesterol in the body and its role in heart disease. Students are introduced to a variety of DNA technologies as they learn about familial hypercholesterolemia genes.
5218.D5.2	Recognize that the type of bond between the carbon atoms in a fatty acid determines whether it is saturated or unsaturated with hydrogen atoms.
5218.D5.3	Compare and contrast the structures and functions of stearic acid, oleic acid, linoleic acid, stearidonic acid and cholesterol.
5218.D5.4	Describe the role of high-density lipoprotein (HDL) and low-density lipoprotein (LDL) in the transport of cholesterol in the blood. Predict how the ratio of these complexes indicates a person's risk for heart disease.
5218.D5.5	Explain the processes of polymerase chain reaction (PCR), restriction fragment length polymorphism, single nucleotide polymorphisms (SNP), and DNA gel electrophoresis in the diagnosis of genetic diseases and disorders such as the familial hypercholesterolemia.

Domain	***Infectious Diseases***
5218.D6.1	Students study bacteria and viruses as the causative agents of infectious diseases. Students examine the structural differences between these organisms through Gram staining and producing models. Students investigate the differences in treatment protocols for bacterial and viral diseases. Students learn about public health campaigns that aim to educate individuals about the dangers and preventions of infectious diseases.
5218.D6.2	Distinguish among the different types of bacteria and recognize that only a few causes disease.
5218.D6.3	Classify bacteria by shape, metabolism, and reaction to Gram staining.
5218.D6.4	Understand that the efficacy of an antibiotic depends on the type of bacteria causing the infection.
5218.D6.5	Analyze the cause and implications of antibiotic resistance.
5218.D6.6	Describe the structure and role of viruses.
5218.D6.7	Describe the reproductive cycles of viruses.
5218.D6.8	Describe effective and ineffective treatments for viral infections.
5218.D6.9	Summarize the symptoms, prevalence, prevention, treatment, and the global economic and social impact of an infectious disease caused by a virus.
5218.D6.10	Describe various ways in which infectious diseases can be spread
5218.D6.11	Understand how public education can help prevent the spread of some diseases through the promotion of basic personal preventive measures including hand washing, surface cleaning, and using tissues.
Domain	***Career Navigation***
5218.D7.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
5218.D7.2	Understand the specialized skills needed for different career opportunities related to the program of study.
5218.D7.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
5218.D7.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
5218.D8.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
5218.D8.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
5218.D8.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
5218.D8.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***

5218.D9.1	Demonstrate computer literacy skills and basic computer functions.
5218.D9.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
5218.D9.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
5218.D9.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Human Body Systems		
Career Cluster	Health & Human Services	
Program of Study	Biomedical Sciences and Technology	
NLPS Sequence	B	
Course Code	5216	
Course Description	*Human Body Systems is a course designed to engage students in the study of basic human physiology and the care and maintenance required to support the complex systems. Using a focus on human health, students will employ a variety of monitors to examine body systems (respiratory, circulatory, and nervous) at rest and under stress, and observe the interactions between the various body systems. Students will use appropriate software to design and build systems to monitor body functions.* ***NOTE:*** *This course aligns with the PLTW Human Body Systems curriculum. Use of the PLTW Curriculum may require additional training and membership in the PLTW network.*	
Prerequisite(s)/ Corequisite(s)	Principles of Biomedical Sciences	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas Fulfills a science requirement for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation: ● Biology 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	

	● Life Science with high school setting
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Science license 9-12 ● Life Science 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Identity***
5216.D1.1	Students investigate the body systems and functions that all humans have in common, and then examine differences between tissues, such as bone and muscle, and in molecules, such as DNA, to pinpoint unique identity.
5216.D1.2	Understand the hierarchical structure and organization of the human body in terms of body systems, organs, and tissues.
5216.D1.3	Explain the functions of the human body systems and describe how multiple body systems are interconnected. Indicate how damage to one system can impact other functions in other systems.
5216.D1.4	Identify the main types of tissue that comprise the organs and relate the structure of a tissue to its function.
Domain	***Communication***
5216.D2.1	Students investigate modes of communication within the human body as well as the ways humans communicate with the outside world. Students investigate the roles of electrical and chemical signals in communication and response in the human body.
5216.D2.2	Describe the structure and function of the central nervous system.
5216.D2.3	Describe how brain functions are mapped onto physical locations within the brain (brain mapping) and determine the regions of the brain responsible for specific human actions and emotions.
5216.D2.4	Describe the relationship between neuron structure and function, including an understanding of how signals are created, transmitted, and received in the human body.

5216.D2.5	Describe ways that communication could be disrupted and how that would impact the function of the human body.
5216.D2.6	Compare reflex and reaction times and relate to processing in the brain.
5216.D2.7	Distinguish between various nervous system disorders and describe their impact on quality of life.
5216.D2.8	Identify the endocrine and exocrine glands and their functions within the human body.
5216.D2.9	Describe how hormones interact with target cells in the human body.
5216.D2.10	Demonstrate use of negative feedback in the endocrine system to control body functions.
5216.D2.11	Explain how stimulus in the form of light is processed by the eye and interpreted by the brain.
5216.D2.12	Describe the structures within the human eye that work to focus and process light.
5216.D2.13	Identify diseases and dysfunction within the eye and how these are related to the functioning of the eye.
Domain	***Flow of Energy and Matter/Resources to Sustain Life***
5216.D3.1	Students investigate the human body systems that work to obtain, distribute, or process the body's primary resources for energy and power—food, oxygen, and water.
5216.D3.2	Describe the relationship between the body systems that process and distribute food, water and oxygen.
5216.D3.3	Describe the structure and function of the organs in the digestive system.
5216.D3.4	Describe the mechanical and chemical activity of the digestive organs, including the action of accessory organs.
5216.D3.5	Describe the effects of temperature, pH, and enzyme concentration on enzyme activity.
5216.D3.6	Explain how energy is stored and released from ATP. Describe how ATP is recycled in cells.
5216.D3.7	Describe the relationship between calorie consumption, expenditure, and overall health.
5216.D3.8	Describe the structure of the respiratory system, the mechanics of breathing and how the structure of the lungs facilitates gas exchange.
5216.D3.9	Describe how oxygen transport is facilitated between the respiratory and cardiovascular systems and determine the effect of a variety of diseases on oxygen transport.
5216.D3.10	Analyze lung volume and oxygen absorption data at rest and after exercise to understand lung efficiency and capacity.
5216.D3.11	Describe the structure and function of the component parts of the urinary system.
5216.D3.12	Describe the normal composition of blood and urine and how this composition is affected by disease states.
5216.D3.13	Explain how the body uses hormones to maintain water balance and interpret the effect of two different hormones on the nephron and overall water balance.
5216.D3.14	Describe fluid and ion movement in the various sections of the nephron.
5216.D3.15	Explain the relationship between the heart and lungs; trace the path of major circulatory routes.
5216.D3.16	Describe the structure of blood vessels and identify the major arteries and veins; name the body region supplied by each.

5216.D3.17	Describe the major circulatory routes.
5216.D3.18	Describe the conduction system of the heart and identify the pathway of impulses through this system.
5216.D3.19	Describe how to measure blood pressure and understand the relationship between blood pressure and pulse points. Use this information to recognize disease states.
5216.D3.20	Apply knowledge of heart rate to calculate and interpret cardiac output values; relate cardiac output values to the health of other body systems.
Domain	***Musculoskeletal System***
5216.D4.1	Students investigate the movement of the human body. Students will examine bones and joints and how muscles and bones work together to move the body. Students will combine information about power and movement to describe how the body fuels and responds to exercise.
5216.D4.2	Describe the structure and function of the skeletal system and the main bones of the human skeleton.
5216.D4.3	Compare the structure and function of compact and spongy bone.
5216.D4.4	Describe the changes in bone structure as we age.
5216.D4.5	Describe the types of bone fractures; interpret X-rays to determine fracture types and possible damage to organs.
5216.D4.6	Describe bone remodeling and distinguish between each stage of this process. Understand the role of hormones (e.g., calcitonin and parathyroid hormone) and calcium balance in this process.
5216.D4.7	Apply knowledge of bone markings, landmarks, and bone measurements to human identification.
5216.D4.8	Describe the structure and function of the different types of joints in the human body.
5216.D4.9	Describe the range of motion for different joints and determine ways to improve joint flexibility.
5216.D4.10	Describe the structure and function of the different types of muscle tissue in the human body. Describe how the structure of muscles can differ between individuals and how this contributes to human identity.
5216.D4.11	Identify the requirements for muscle contraction and explain the sliding filament mechanism.
5216.D4.12	Describe how different muscles work together in a group.
5216.D4.13	Understand the role of nerves in the functioning of muscles
5216.D4.14	Describe the role of exercise on skeletal muscle tissue.
5216.D4.15	Understand how to measure muscle fatigue and how feedback, competition and coaching affect an athlete's ability to overcome muscle fatigue.
5216.D4.16	Describe how the body responds to the physical stress of an athletic event and how an athlete prepares to overcome this.
Domain	***Skin***
5216.D5.1	Students will identify key layers of tissues as well as the epithelial and connective tissue at the core of human skin. They will relate the tissues and the accessory organs such as sweat glands and hair follicles to the many functions of the skin. Students will be able to discuss how

	damage to the skin can affect the function of the skin and of other body systems.
5216.D5.2	Describe the structure and function of human skin.
5216.D5.3	Explain how the human body senses and processes signals of pain.
5216.D5.4	Explain why pain can be considered a protective mechanism.
5216.D5.5	Distinguish between different degrees of burns and relate to damage in skin layers.
5216.D5.6	Interpret how burn damage to the skin will affect the function of the organ and overall homeostasis in the body.
5216.D5.7	Describe how burn damage to skin can affect quality of life.
Domain	***Lymphatic and Immune Systems***
5216.D6.1	Students will research the structure and function of the lymphatic and immune system. Students will understand lymphatic and immune system functions to drain and distribute fluid in the body as well as protect the human body against specific invaders.
5216.D6.2	Describe the structures and functions of the lymphatic and immune systems.
5216.D6.3	Describe the interaction between antigens and antibodies.
5216.D6.4	Explain how blood cells are involved in specific immunity; apply knowledge of specific immunity to describe how vaccines work.
5216.D6.5	Interpret a pedigree to determine blood types; apply knowledge of antigen-antibody interactions to determine potential blood donors for a transfusion.
5216.D6.6	Describe how antibody concentrations are affected by infection.
5216.D6.7	Relate knowledge of antibody response to specific actions of cell types in the immune system.
Domain	***Investigating Medical Data***
5216.D7.1	Students use medical data to investigate human body systems. Students use current techniques in biotechnology to unlock the clues of identity found in DNA.
5216.D7.2	Evaluate medical data and use this information to build a unique case study and design a medical intervention.
5216.D7.3	Use current biotechnology processes and techniques to compare similarities and differences in DNA samples from different individuals.

Anatomy and Physiology	
Career Cluster	Health & Human Services
Program of Study	Biomedical Sciences and Technology
NLPS Sequence	B
Course Code	5276
Course Description	*Anatomy & Physiology is a course in which students investigate concepts related to Health Science, with emphasis on interdependence of systems and contributions of each system to the maintenance of a healthy body. It introduces students to the cell, which is the basic*

	structural and functional unit of all organisms, and covers tissues, integument, skeletal, muscular and nervous systems as an integrated unit. Through instruction, including laboratory activities, students apply concepts associated with Human Anatomy & Physiology. Students will understand the structure, organization and function of the various components of the healthy body in order to apply this knowledge in all health related fields.
Prerequisite(s)/ Corequisite(s)	None Recommended: Biology
Credits	1 to 2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas Fulfills a Core 40 Science course requirement for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level I
Bulletin 400	● No License Available
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Workplace Specialist: Dental Careers
REPA/REPA 3	● Life Sciences 5-12 ● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12 ● Workplace Specialist: Dental Careers 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	APHY 101: Anatomy and Physiology I; APHY 102: Anatomy and Physiology II
VU Course Alignment	BIOL 111/L (Lab): Anatomy & Physiology I, BIOL 112/L (Lab): Anatomy & Physiology II
Four Yr. Course Alignment	BSU - ANAT 201: Fundamentals of Human Anatomy, PHYS 215: Human Physiology ISU - BIO 231/L Human Anatomy & Lab, BIO 241/L: Human Physiology & Lab IUN - PHSL-P130/BIOL-N213: Human Biology w/ Lab
Postsecondary Credential	BSU – B.S. in Respiratory Therapy (51.0908) ISU – Nursing (51.3801) IUN – B.S. in Nursing (51.3801) VU – C.G. Health Care Professional – Pre-Nursing CNA Track (51.3801)
Liberal Arts/Sciences Requirements	
Promoted	

Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Levels of Organization in the Human Body: Cellular***
5276.D1.1	Students confirm the different forms of cellular transport within the cell and across the plasma membrane.
5276.D1.2	Verify anatomy and physiology and describe their subdivisions
5276.D1.3	Analyze the functions of the organelles of the cell
5276.D1.4	Evaluate the plasma membrane structure to active passive transport mechanisms
5276.D1.5	Connect the difference between the transport processes relative to energy source, substances transported, direction, and mechanism
5276.D1.6	Analyze the parts of a cell and their basic functions
5276.D1.7	Students synthesize stages and processes of somatic cell division and investigate cellular differentiation during development and in the adult body.
5276.D1.8	Analyze the functions of the parts of a microscope
5276.D1.9	Analyze the phases of the cell cycle using models and a microscope
5276.D1.10	Evaluate the key phases of the cell cycle and describe the key events in each phase, including cytokinesis
5276.D1.11	Evaluate the process of cell division and why cells are considered living
5276.D1.12	Connect transcription and translation
5276.D1.13	Analyze the functions of the parts of a microscope
Domain	***Levels of Organization in the Human Body: Tissue and Organs***
5276.D2.1	Students apply and adapt the role of adhesion molecules and how these contribute to tissue formation.
5276.D2.2	Verify homeostasis and explain its significance
5276.D2.3	Recommend the 11 organ systems of the body and identify their components
5276.D2.4	Analyze common body movements
5276.D2.5	Evaluate the anatomical position
5276.D2.6	Choose the correct anatomical terms to describe body directions, regions, and body planes
5276.D2.7	Evaluate the importance of water in the human body
5276.D2.8	Connect the relationship between homeostasis imbalance and disease
5276.D2.9	Verify anatomy and physiology and describe their subdivisions
5276.D2.10	Choose the different levels of structural organization that make up the human body, and explain their relationship
5276.D2.11	Choose and name the major body cavities and their subdivisions and list the major organs contained within them
5276.D2.12	Students analyze the relationships between the histology and physiological functions of tissues and their cellular and biochemical composition.

5276.D2.13	Choose the nine regions and four quadrants of the abdominopelvic cavity and list organs the contain
5276.D2.14	Synthesize chemical element and list the elements that form the bulk of body matter
5276.D2.15	Choose the different levels of structural organization that make up the human body, and explain their relationships
5276.D2.16	Confirm how negative and positive feedback maintain body homeostasis
5276.D2.17	Name the different levels of structural organization that make up the human body
5276.D2.18	Evaluate and locate the four basic tissue types of the body and explain their functions
5276.D2.19	Verify atomic number, atomic mass, atomic weight, isotope, and radioisotope
5276.D2.20	Verify the three types of chemical reactions: synthesis, decomposition, and exchange
5276.D2.21	Verify acid and base, and explain the concept of pH
5276.D2.22	Establish and compare the building blocks, general structures, and biological functions of carbohydrates, proteins, lipids, and nucleic acids
Domain	***Movement and Support in the Human Body: The Integumentary System***
5276.D3.1	Students analyze the structure of the skin, including layers as well as accessory structures such as hair follicles, glands, and nails.
5276.D3.2	Identify the microscopic anatomy, location, and roles of the four basic tissue types
5276.D3.3	Identify mucous, serous, and synovial membranes
5276.D3.4	Students connect the function of the Integumentary system, and the cause and effect of diseases associated with the integumentary system.
5276.D3.5	Verify the functions of the skin
5276.D3.6	Analyze the roles of the specific layers of the skin
5276.D3.7	Describe the structure and functions of the accessory structures of the skin
5276.D3.8	Identify the gross anatomy of the skin and the accessory structures
Domain	***Movement and Support in the Human Body: Skeletal System***
5276.D4.1	Students evaluate the structure, development, growth, and functions of bones.
5276.D4.2	Analyze the major regions of the skeleton and describe their relative functions
5276.D4.3	Select and describe common body movements
5276.D4.4	Select and provide examples of the types of synovial joints
5276.D4.5	Synthesize the structure and function of the gross and microscopic structures of skeletal muscle
5276.D4.6	Select the four bone classes and provide examples of each
5276.D4.7	Choose and describe the functions of the bone
5276.D4.8	Evaluate the gross anatomy of a typical long bone
5276.D4.9	Analyze the histology of compact and cancellous bone
5276.D4.10	Verify inorganic and organic portions of the bone
5276.D4.11	Verify intramembranous and endochondral ossification
5276.D4.12	Verify the role of osteoblasts, osteocytes, and osteoclasts

5276.D4.13	Connect how hormones and stress regulate bone remodeling
5276.D4.14	Verify the steps in fracture repair
5276.D4.15	Analyze microscopic structures of bone
5276.D4.16	Analyze the major parts of the axial and appendicular skeleton
5276.D4.17	Evaluate the structures of a typical vertebrae and identify regional features of cervical, thoracic, and lumbar vertebrae
5276.D4.18	Evaluate the skull bones and their major features
5276.D4.19	Analyze bones of the thoracic cage
5276.D4.20	Evaluate bones forming the pectoral girdle and their major features
5276.D4.21	Analyze the bones of the upper limbs and their major features
5276.D4.22	Evaluate the bones of the lower limb and their major features
5276.D4.23	Choose characteristics of the fetal skull
5276.D4.24	Select the bones of the Os Coxae and their major features
Domain	***Movement and Support of the Human Body: The Muscular System***
5276.D5.1	Students connect physiology and structure of skeletal, smooth, and cardiac muscle as they interact to provide movement and support of the human body.
5276.D5.2	Analyze the sliding filament model of muscle contraction
5276.D5.3	Evaluate the methods that are used to produce ATP for muscle contraction
5276.D5.4	Select the different types of muscle contraction
5276.D5.5	Establish four important functions of muscle tissue
5276.D5.6	Verify microscopic anatomy of skeletal muscle
5276.D5.7	Select the location of the major skeletal muscles
5276.D5.8	Evaluate the definition of origin, insertion and action of a muscle and identify the O, I, A of one muscle from each region of the body
5276.D5.9	Students evaluate the microscopic structure, organization, functions, and molecular basis of contraction in skeletal, smooth, and cardiac muscle.
5276.D5.10	Choose the types of skeletal muscle fibers (fast-twitch, slow twitch)
5276.D5.11	Choose muscle twitch, tetanus, and motor unit
5276.D5.12	Connect the gross, microscopic anatomy, contractile mechanisms of smooth muscle and cardiac muscle to skeletal muscle
5276.D5.13	Describe the structure and function of the gross and microscopic structures of skeletal muscle
5276.D5.14	Choose characteristics of the three major types of levers
Domain	***Integration and Coordination in the Human Body: The Nervous System***
5276.D6.1	Students establish the nervous system consists of two parts: the peripheral nervous system and the central nervous system and understand the structure and function of each.
5276.D6.2	Describe the basic functions of the nervous system
5276.D6.3	Explain the basic functions of the nervous system
5276.D6.4	Describe functions and differences in the parts of the autonomic nervous system

5276.D6.5	Describe in the parts of the autonomic nervous system
5276.D6.6	Identify characteristics of sensory receptors
5276.D6.7	Describe olfactory receptors and their role in the physiology of smell
5276.D6.8	Describe gustatory receptors and their role in the physiology of taste
5276.D6.9	Describe neurotransmitters and explain their roles in synaptic transmission
5276.D6.10	Name the components of a reflex arc and identify their roles in nervous system function
5276.D6.11	Identify the component of parts of the brain and spinal cord
5276.D6.12	Students apply concepts of contemporary electrophysiological technologies such as (for example) electroencephalogram (EEG), electrocardiogram (ECG), transcutaneous electrical nerve stimulation (TENS) and cardioversion.
5276.D6.13	Define resting membrane potential and describe its electrochemical basis
5276.D6.14	Compare and contrast action and graded potentials
5276.D6.15	Explain how action potentials are generated and propagated along neurons
5276.D6.16	Identify gross and microscopic anatomy of nervous tissue
5276.D6.17	Identify the protective roles of the cranial bones, meanings, and cerebrospinal fluid
5276.D6.18	Identify the component parts of a reflex arc
5276.D6.19	Identify the gross and microscopic anatomy of the eye
5276.D6.20	Identify the gross and microscopic anatomy of the ear
Domain	***Integration and Coordination in the Human Body: Somatic and Special Senses***
5276.D7.1	Students connect somatic senses and special senses and classify sensory receptors according to the types of stimuli that activate them.
5276.D7.2	Verify the division, origin, and function of component parts of the brain
5276.D7.3	Evaluate the functions of the cranial nerves
5276.D7.4	Analyze the gross and microscopic structure of the spinal cord
5276.D7.5	Connect the anatomy and physiology of sensory and motor pathways in the brain and spinal cord
Domain	***Integration and Coordination in the Human Body: The Endocrine System***
5276.D8.1	Students apply and adapt the structure and function of the endocrine system in relation to homeostasis, including a discussion of the specific role of hormones and distinguishing between endocrine glands and endocrine cells found in other organs.
5276.D8.2	Establish the general function of the endocrine system
5276.D8.3	Verify gland and differentiate between endocrine glands
Domain	***Absorption and Excretion in the Human Body: The Respiratory System***
5276.D9.1	Students verify and locate major organs of the respiratory system and discuss their functions.
5276.D9.2	Confirm the general functions of the respiratory system
5276.D9.3	Choose the mechanisms of gas exchange in the lungs and tissues
5276.D9.4	Students evaluate the breathing processes (i.e., inspiration, expiration, respiratory volumes, and capacities).

5276.D9.5	Connect how oxygen is carried in the blood and what influences oxygen loading and unloading
5276.D9.6	Establish the processes of internal and external respiration
Domain	***Absorption and Excretion in the Human Body: The Urinary System***
5276.D10.1	Students evaluate and locate major organs of the urinary system and discuss their functions.
5276.D10.2	Establish the general functions of the urinary system
5276.D10.3	Apply and adapt the regulation of water intake and output
5276.D10.4	Integrate the major fluid compartments including intracellular, intravascular, and interstitial
5276.D10.5	Students analyze the function of the kidneys in relation to homeostatic control of bodily fluids, blood pressure and erythrocyte production.
5276.D10.6	Analyze the functional process of urine formation, including filtration, re-absorption, and secretion.
5276.D10.7	Select factors that regulate urine volume and composition
5276.D10.8	Evaluate buffer systems and their role in acid/base balance
Domain	***Transport in the Human Body: The Blood***
5276.D11.1	Students evaluate the process of homeostasis and how it is achieved.
5276.D11.2	Evaluate the process of homeostasis, including coagulation
5276.D11.3	Students analyze the functions of the blood including its role in responding to invading microorganisms, its defense mechanisms (e.g., acute inflammation), and the immune response.
5276.D11.4	Analyze the general functions of the blood
5276.D11.5	Evaluate the composition and function of plasma
5276.D11.6	Analyze the composition and function of the formed elements of the blood
5276.D11.7	Evaluate the functional roles and characteristics of the different types of blood vessels
5276.D11.8	Verify how carbon dioxide is carried in the blood
5276.D11.9	Connect the regulation of blood volume, heart rate, stroke, volume, cardiac output and blood pressure
Domain	***Transport in the Human Body: The Cardiovascular System***
5276.D12.1	Students apply concepts and locate the organs of the cardiovascular system and discuss their functions.
5276.D12.2	Select the general functions of the cardiovascular system
5276.D12.3	Verify the physiology of cardiac muscle contraction
5276.D12.4	Students manage the cardiac cycle and explain how it is controlled.
5276.D12.5	Integrate the cardiac cycle, including basic rhythm of heartbeat, and pressure and volume changes
5276.D12.6	Connect control of pulmonary ventilation
Domain	***Transport in the Human Body: The Lymphatic System and Immune Mechanisms***
5276.D13.1	Students select the major organs of the lymphatic system and discuss their functions.
5276.D13.2	Analyze the general functions of the lymphatic system

5276.D13.3	Students establish the lines of defense including the cellular and non-cellular components of the immune system.
5276.D13.4	Evaluate the pattern of lymph circulation
Domain	***Absorption and Excretion in the Human Body: The Digestive System***
5276.D14.1	Students synthesize and locate major and accessory organs of the digestive system and discuss their functions.
5276.D14.2	Verify the mechanical and chemical processes of digestion and absorption
5276.D14.3	Confirm hormonal and neural regulation of digestive processes
5276.D14.4	Students evaluate the digestive processes from ingestion to defecation.
5276.D14.5	Choose the functions of the different organs of the gastrointestinal tract and the accessory organs of digestion
Domain	***The Life Cycle in the Human Body: The Reproductive System***
5276.D15.1	Students analyze and locate major and accessory organs of the female reproductive systems and discuss their functions including oogenesis and spermatogenesis.
5276.D15.2	Evaluate the general functions of the reproductive system
5276.D15.3	Select the specific roles of the ovaries, fallopian tubes, uterus, and vagina
5276.D15.4	Integrate the developmental highlights or an embryo and fetus
5276.D15.5	Design the birth process
5276.D15.6	Students connect the role of hormones in the reproductive system.
5276.D15.7	Establish the specific roles of the testes, epididymis vas deferens, seminal vesicles, prostate, bulbourethral glands, and urethra
5276.D15.8	Analyze the hormonal changes during the menstrual cycle
5276.D15.9	Verify the hormonal changes that occur during pregnancy
5276.D15.10	Describe sex determination

Medical Interventions	
Career Cluster	Health & Human Services
Program of Study	Biomedical Sciences and Technology
NLPS Sequence	C
Course Code	5217
Course Description	*Medical Interventions is a course that studies medical practices, including interventions, to support humans in treating disease and maintaining health. Using a project-based learning approach, students will investigate various medical interventions that extend and improve quality of life, including gene therapy, pharmacology, surgery, prosthetics, rehabilitation, and supportive care. Students will also study the design and development of various interventions. Lessons will cover the history of organ transplants and gene therapy with additional readings*

	from current scientific literature addressing cutting edge developments. ***NOTE:*** *This course aligns with the PLTW Medical Interventions curriculum. Use of the PLTW Curriculum may require additional training and membership in the PLTW network.*
Prerequisite(s)/ Corequisite(s)	Principles of Biomedical Sciences
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas Fulfills a science requirement for all diploma types
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level I
Bulletin 400	● No License Available
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation: ● Biology 9-12
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Life Science with high school setting
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Science license 9-12 ● Life Science 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Medical Interventions***

5217.D1.1	Students investigate the variety of interventions involved in the prevention, diagnosis, and treatment of disease.
5217.D1.2	Identify and describe the main categories of medical interventions and when they are necessary to maintain human health.
5217.D1.3	Describe how scientists gather evidence about a disease or disorder to determine if a medical intervention is necessary.
5217.D1.4	Describe the steps that scientists take to diagnose, treat, and prevent diseases and disorders.
5217.D1.5	Understand the difference between chronic and acute inherited and non-inherited disorders and communicable diseases.
Domain	***Infectious Diseases, Treatments and Preventions***
5217.D2.1	Students explore the diagnostic process used to identify an unknown infection, the use of antibiotics as a treatment, how bacteria develop antibiotic resistance, and how vaccinations are developed and used to prevent infection.
5217.D2.2	Describe how infectious diseases are spread throughout a population.
5217.D2.3	Compare and contrast bacterial and viral infections regarding their diagnosis, treatment and outcome.
5217.D2.4	Describe how antibiotics disrupt the functioning of bacteria to stop a bacterial infection.
5217.D2.5	Understand how bacteria can develop resistance to antibiotics.
5217.D2.6	Explain human behaviors that promote the development of antibiotic-resistant bacteria in our population.
5217.D2.7	Understand the role of vaccination in the prevention and treatment of disease and how this has impacted disease trends.
5217.D2.8	Describe the molecular tools and recombinant DNA technologies used to produce vaccines.
5217.D2.9	Describe how vaccines activate the body's immune system.
Domain	***The Ear and Hearing Loss***
5217.D3.1	Students investigate the physics of sound as well as learn how hearing works and will conduct a variety of hearing assessments. Students will explore how damage to the outer, middle, and/or inner ear results in hearing loss. Students will learn how to interpret audiograms and match up their patient case study with the corresponding audiogram.
5217.D3.2	Describe the three-dimensional structure of the human ear and how the structure relates to its function.
5217.D3.3	Understand how diseases can affect the functioning of the ear.
5217.D3.4	Describe how auditory function is measured and used to diagnose hearing problems.
5217.D3.5	Understand the treatments for hearing loss and the bioethical concerns related to cochlear implants.
Domain	***Genetic Screening***
5217.D4.1	Students explore how to screen and evaluate the code in our DNA. Students will examine the available types of genetic testing and screening and discuss ethical implications of these tests. Students will focus on prenatal testing, newborn testing, and carrier screening; however, the use of genetic testing to screen for disease risk will also be addressed. Students will examine how the study of genetics will alter the way doctors and scientists treat disease, as well as the

	way humans reproduce. Students will learn about gene therapy, a potentially life-saving treatment for many debilitating genetic disorders.
5217.D4.2	Describe the different biotechnologies that are used in genetic testing.
5217.D4.3	Describe how genetic testing is used to screen for disease risk.
5217.D4.4	Describe the types of prenatal and newborn testing and screening that are available, the information they provide, their limitations, risks, and ethical implications.
5217.D4.5	Understand the role of gene therapy in treating genetically inherited diseases.
5217.D4.6	Describe how vectors are engineered to transfer DNA to human cells.
Domain	***Cancer***
5217.D5.1	Students explore the diagnostic process used to determine the presence of cancerous cells, the risk factors and prevention of cancer, rehabilitation after disease or injury, and the design process for new medications, prosthetics, and nanotechnology.
5217.D5.2	Describe the different agents that cause changes in genetic material resulting in cancer.
5217.D5.3	Describe the fundamental characteristics that all cancers have in common.
5217.D5.4	Describe the different types of diagnostic imaging techniques that are currently used to detect and diagnose different forms of cancer.
5217.D5.5	Describe the microscopic differences between cancer cells and normal cells.
5217.D5.6	Understand that the sequence of an individual's DNA is the same in every cell and when compared with individuals of the same species it will be mostly identical. Recognize that there are differences in how genes are expressed in tissues within an individual and between individuals of the same species.
5217.D5.7	Describe how microarray technology is used to detect changes in gene expression from the same tissue types of different individuals.
5217.D5.8	Describe the molecular tests that are used to detect inherited cancers.
5217.D5.9	Describe ways in which individuals can reduce their risk for developing cancer.
5217.D5.10	Describe the most common cancer treatments and how these affect cancerous and noncancerous tissues.
5217.D5.11	Describe how new cancer treatments are being developed and tailored to an individual's genetic profile.
Domain	***Synthesizing Proteins to Treat Human Disease***
5217.D6.1	Students learn how to produce and purify a protein in a laboratory setting to understand how human insulin is produced to treat diabetics.
5217.D6.2	Demonstrate how amino acid sequence determines protein shape.
5217.D6.3	Explain how bacterial plasmids are used to produce human proteins.
5217.D6.4	Describe current techniques in biotechnology that are employed for large scale production of transgenic human proteins.
5217.D6.5	Describe the role of insulin and its large-scale production in the treatment of diabetes.
Domain	***Organ Failure***
5217.D7.1	Students investigate current organ transplant technologies and construct an argument from the perspective of different stakeholders.

5217.D7.2	Describe how organ failure is diagnosed, what the available treatment options are and how a determination is made regarding organ transplant.
5217.D7.3	Describe how organs are matched using blood typing and HLA typing.
5217.D7.4	Describe general surgical techniques employed in live organ donor transplant.
5217.D7.5	Identify which human organs can be replaced and explain why other organs cannot.
5217.D7.6	Describe the benefits and risks of using xenotransplantation and tissue engineering for replacement.

Biomedical Innovations		
Career Cluster	Health & Human Services	
Program of Study	Biomedical Sciences and Technology	
NLPS Sequence	D	
Course Code	5219	
Course Description	*Biomedical Innovations is a capstone course designed to give students the opportunity to design innovative solutions for the health challenges of the 21st century as they work through progressively challenging open-ended problems, addressing topics such as clinical medicine, physiology, biomedical engineering, and public health. Students have the opportunity to work on an independent project and may work with a mentor or advisor from a healthcare or postsecondary industry. Throughout the course, students are expected to present their work to an adult audience that may include representatives from the local business and healthcare community.* ***NOTE:*** *This course aligns with the PLTW Biomedical Innovations curriculum. Use of the PLTW Curriculum may require additional training and membership in the PLTW network.*	
Prerequisite(s)/ Corequisite(s)	Principles of Biomedical Sciences; Human Body Systems or Anatomy and Physiology; Medical Interventions	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation: ● Biology 9-12	
Rules 2002	● CTE: Health Occupations with high school setting	

	● Workplace Specialist: Health Careers ● Life Science with high school setting
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Science license 9-12 ● Life Science 5-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Design an Effective Emergency Room***
5219.D1.1	Use knowledge of emergency medical careers, diagnostic testing and patient evaluation, human body systems, and medical interventions to analyze the working of an emergency room.
5219.D1.2	Discuss inefficiencies in emergency rooms.
5219.D1.3	Design a more efficient emergency medicine delivery system.
Domain	***Exploring Human Physiology***
5219.D2.1	Investigate research study methods.
5219.D2.2	Research how to set up and conduct valid and reliable studies.
5219.D2.3	Investigate ways in which data can be manipulated and explore what to look for when evaluating data presented by others.
5219.D2.4	Critique scientific data presented in popular media and compare such data to scientific data presented in scientific journals.
5219.D2.5	Use scientific data analysis to analyze the results of a scientific investigation.
5219.D2.6	Choose a question relating to one or more body systems then design, conduct, and analyze an experimental study to answer the question.
Domain	***Design a Medical Innovation***
5219.D3.1	Investigate the evolution of various biomedical products.
5219.D3.2	Brainstorm ideas for a new biomedical product or for a way to improve an existing product.

5219.D3.3	Evaluate biomedical solutions of the past and present.
5219.D3.4	Explore possible biomedical design solutions, select the best approach, and develop a design proposal for a new or improved biomedical product.
5219.D3.5	Create and build a model, prototype, or schematic and create a marketing plan to pitch product to potential investors.
Domain	***Investigating Environmental Health***
5219.D4.1	Investigate various aspects of environmental health.
5219.D4.2	Explore and analyze case studies to identify environmental health concerns and toxins and identify potential exposures in students' own daily lives.
5219.D4.3	Test local water samples as well as simulated well water for presence of coliforms and E. coli.
5219.D4.4	Isolate DNA from three different bacterial cultures and perform PCR to detect hazardous bacterial strains that may cause various symptoms.
5219.D4.5	Study the relationship between exposure and illness using a case study involving lead poisoning.
5219.D4.6	Design an experiment to test the effects of particular chemicals and doses on plant growth.
5219.D4.7	Use results to produce a dose-response curve and relate graph to overall effect of selected chemical.
5219.D4.8	Compile a comprehensive environmental health profile of students' local area using publicly available databases, as well as personal contacts and visits, to uncover people, wildlife, and environmental resources.
5219.D4.9	Use compiled information to design an action plan to increase awareness, monitor resources or individuals in the community, improve conditions, and ensure a clean and safe environment.
Domain	***Combating a Public Health Issue***
5219.D5.1	Evaluate patient diagnostic test results to identify illness.
5219.D5.2	Assess evidence to deduce source of illness.
5219.D5.3	Design and analyze an epidemiological study to test proposed source.
5219.D5.4	Plan control and prevention efforts to limit future cases of illness.
5219.D5.5	Investigate major health issues in students' local area, across the United States, and around the globe.
5219.D5.6	Evaluate what types of interventions would address various health issues and begin to identify where a comprehensive public health plan would have the greatest impact.
5219.D5.7	Propose an intervention plan that targets an infectious disease, a chronic illness, a specific injury or set of injuries, a mental illness, or any other pressing health concern with focus on treatment, prevention, research, or education efforts surrounding the chosen health issue.

Healthcare Specialist Capstone		
Career Cluster	Health & Human Services	
Program of Study	Biomedical Sciences and Technology, Pre-Nursing/Healthcare Specialist, Emergency Medical Services, Medical Assistant	
NLPS Sequence	D	
Course Code	7255	
Course Description	*The Healthcare Specialist Capstone course will facilitate healthcare students' acquisition of additional knowledge and skills necessary to work in a variety of healthcare settings beyond a long term care facility including hospitals, doctors' offices, and clinics. Students can accomplish this goal by completing coursework that will cover topics such as Medical Law and Ethics, Electronic Health Records, and/or Behavioral Health. Schools may offer additional healthcare certifications such as the Certified Clinical Medical Assistant (CCMA) or Phlebotomy along with the coursework or in place of the coursework.*	
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare; Healthcare Fundamentals; Healthcare Specialist: CNA, EMT or Certified Clinical Medical Assistant (CCMA)	
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation: First Responder 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Emergency Medical Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 105: Medical Law and Ethics; HLHS 122: Electronic Health Records; HLHS 125: Behavioral Health	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711)	

Liberal Arts/Sciences Requirements	
Promoted Certifications	Certified Medical Assistant (CMA)

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Medical Law and Ethics***
7255.D1.1	Explain how professional standards, laws, and ethics guide behavior for health care professionals in medical practices, hospitals, long term care facilities, clinics, and in emergency service settings.
7255.D1.2	Compare and contrast concepts related to ethics, bioethics, and law.
7255.D1.3	Discuss the United States legal system and processes as they relate to medical practice.
7255.D1.4	Describe the current health care environment including types of practices, licensing, and certification of health care professionals.
7255.D1.5	Defend the right of physicians and their patients as protected by federal and state laws.
7255.D1.6	Detail federal and state statutes pertinent to health care professionals in the areas of hiring and employment, safety, patient privacy and confidentiality, consumer protection, and public records/reporting.
7255.D1.7	Outline the public duties expected of physicians in the areas of reporting, legal records, management of controlled substances, and the Good Samaritan laws.
7255.D1.8	Outline appropriate risk management procedures regarding minimizing litigation and practicing within legal boundaries.
7255.D1.9	Describe accepted processes for handling medical records and for medical documentation.
7255.D1.10	Apply course concepts to discussions of bioethical dilemmas.
7255.D1.11	Describe the process, principles, and issues of risk management.
7255.D1.12	Describe the transaction, privacy and security standards as related to HIPAA.
Domain	***Electronic Health Records***
7255.D2.1	Acquire, store and retrieve patient information from the EHR database.
7255.D2.2	Execute, manage EHR database and maintain software and hardware including updates and file maintenance (e.g., purging, archiving).
7255.D2.3	Operate integrated devices with EHR software (e.g., scanners, fax machine, signature pads, and cameras) to transmit patient data for external use (e.g., insurance, pharmacies, and other providers).
7255.D2.4	Access clinical vocabularies in a health information system when appropriate and comply with patient safety standards regarding abbreviations in the health information system.
7255.D2.5	Generate Insurance verifications, patient statements, encounter forms/super bills, and face/admission sheets.
7255.D2.6	Retrieve diagnosis and procedural descriptions from medical records, enter codes and billing information into the EHR, and post payments to patient accounts at the time of visit.
7255.D2.7	Understand how to find codes in the ICD, CPT and HCPCS manuals.
7255.D2.8	Review charts to ensure compliance of proper charting, report to the proper enforcement office, and document the link between effective charting and reimbursement for procedures performed by clinicians.

7255.D2.9	Adhere to professional standards of care, including HIPAA Privacy & Security Rules and facility policy, as they pertain to medical records.
7255.D2.10	Generate reports for clinical and financial resources (e.g., aging report and financial analysis).
7255.D2.11	Compile and maintain medical care and census data for continuity of care records (e.g., reports on diseases treated, surgery performed, and use of hospital beds for clinical audits).
7255.D2.12	Provide ongoing end-user training and technical support of EHR software.
7255.D2.13	Execute EHR workflow, patient flow within the office (e.g., scheduling, patient registration and verification, patient referrals.
7255.D2.14	Use proper privileges and develop clinical templates from existing searchable databases.
Domain	***Behavioral Health***
7255.D3.1	Identify theories and demonstrate fundamental knowledge of biological, sociological, cultural, psychological, and spiritual development across the adult lifespan.
7255.D3.2	Define and discuss the impact of culture, diversity, and social justice as they pertain to perception and treatment of behavioral health concerns and aging.
7255.D3.3	Examine lifestyle behaviors associated with the development of chronic behavioral health illnesses.
7255.D3.4	Discuss and identify treatment options, pharmacological and non-pharmacological interventions of psychological and behavioral disorders for the following: Anxiety, Stress Disorders, Disorders of Mood, Eating Disorders, Substance Use and Addictive Disorders, Disorders of Aging and Cognition, exhibiting expression or indications of distress (i.e., anxiety, striking out, self-isolating, etc.)
7255.D3.5	Identify types and classes of drugs related to the treatment of selected behaviors and abnormal behaviors, including potential complications from drug interactions.
7255.D3.6	Discuss and define parameters of therapeutic touch and communication.
7255.D3.7	Demonstrate general and specific verbal interventions used to support patient treatment and recovery.
7255.D3.8	Demonstrate understanding of caregiver behaviors which support low conflict interactions with patients.
7255.D3.9	Identify strategies for behavioral health promotion and interprofessional collaborative practice when interacting with patients with behavioral health issues.
7255.D3.10	Describe and discuss the dying process, the definition of death, and the stages of grief as they apply to caregivers.
Domain	***Healthcare Specialist Certifications***
7255.D4.1	Certified Nursing Assistant (CNA)
7255.D4.2	Emergency Medical Technician (EMT)
7255.D4.3	Certified Clinical Medical Assistant (CCMA)
7255.D4.4	Phlebotomy (dual enrollment only)
7255.D4.5	Electrocardiography (dual enrollment only)

Health & Human Services Central Service Technician							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7168	Principles of Healthcare	5274	Healthcare Fundamentals	7163	Central Service Technician Fundamentals	7257	Central Service Technician Capstone

Principles of Healthcare		
Career Cluster	Health & Human Services	
Program of Study	Central Services Technician, Certified Clinical Medical Assistant, Emergency Medical Services, Pharmacy, Pre-Nursing/Healthcare Specialist: Certified Nursing Aide (CNA)	
NLPS Sequence	A	
Course Code	7168	
Course Description	*Principles of Healthcare content examines skills common to specific health career topics such as patient nursing care, dental care, animal care, medical laboratory, public health, and an introduction to healthcare systems. Lab experiences are organized and planned around the activities associated with the student's career objectives.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 100: Intro to Healthcare, HLHS 104: CPR- Basic Life Support	

VU Course Alignment	HSGN 102: Introduction to Health Careers
Four Yr. Course Alignment	USI - HP 211: The Healthcare Delivery System, KIN 192: Concepts in Wellness and Fitness IUB - SPH B150: Introduction to Public Health
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711) VU - C.G. Health Care Professional - Pre-Nursing CNA Track (51.3801) IUB - B.S. in Public Health USI – B.S. in Community and Public Health (51.0701)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Healthcare Systems***
7168.D1.1	Describe how health care is developed, delivered, and organized.
7168.D1.2	Discuss health care delivery systems and trends.
7168.D1.3	Identify ethical and legal issues in health care.
7168.D1.4	Apply basic medical terminology principles.
7168.D1.5	Identify the basic organization of the human body, the body systems, and the stages of growth and development.
7168.D1.6	Analyze behaviors for success in the health care field, including lifestyles management, professionalism, and lifelong learning.
7168.D1.7	Describe personal and workplace safety measures including body mechanics, infection control, and environmental safety.
7168.D1.8	Discuss principles of communication in a health care setting including treating the patient with respect as an individual, accommodation of cultural diversity, identifying and providing for patient needs.
7168.D1.9	Identify the purposes and procedures for medical documentation.
7168.D1.10	Compare various health care occupations, including education requirements, credentialing or licensing, scope of practice, and workforce data.
Domain	***CPR / Basic Life Support***
7168.D2.1	Recognize cardiac vascular emergencies and/or respiratory arrest and take appropriate action.
7168.D2.2	Establish an airway and initiate ventilation.
7168.D2.3	Manage obstructed airway in adult, child, and infant.
7168.D2.4	Perform one and two-person adult, child and infant CPR using universal precautions.
7168.D2.5	Demonstrate the use of an Automated External Defibrillator (AED)
Domain	***Wellness Knowledge***
7168.D3.1	Define fitness/wellness and the major areas it encompasses.
7168.D3.2	Assess individuals' level of fitness (including blood pressure, resting heart rate, flexibility, muscle strength and endurance, body composition, and aerobic capacity).
7168.D3.3	Learn safe and effective exercise routines with proper technique.

7168.D3.4	Design a personal health and fitness plan and a healthy eating plan to incorporate into a healthy lifestyle.
7168.D3.5	Develop a behavior modification plan that would encourage individuals to exercise.
7168.D3.6	Discuss the wellness wheel and interrelatedness of stress, nutrition, exercise, and weight management for a healthy quality of life.
7168.D3.7	Discuss lifestyle choices and their effect on fitness and wellness with regard to disease, disease prevention, and substance abuse (holistic, prescription, and illegal drugs).
7168.D3.8	Provide guidelines for prescribing lifestyle changes to improve levels of wellness/fitness.
Domain	***Career Navigation***
7168.D4.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7168.D4.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7168.D4.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7168.D4.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7168.D5.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7168.D5.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7168.D5.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7168.D5.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7168.D6.1	Demonstrate computer literacy skills and basic computer functions.
7168.D6.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7168.D6.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7168.D6.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Healthcare Fundamentals	
Career Cluster	Health & Human Services
Program of Study	Central Service Technician, Certified Clinical Medical Assistant, Emergency Medical Services, Pharmacy, Pre-Nursing/Healthcare Specialist: Certified Nursing Aide (CNA)
NLPS Sequence	B
Course Code	5274

Course Description	*Healthcare Fundamentals prepares students with language skills necessary for effective, independent use of health and medical reference materials. It includes the study of health and medical abbreviations, symbols, and Greek and Latin word part meanings, all taught within the context of body systems. This course builds skills in pronouncing, spelling, and defining new words encountered in verbal and written information in the healthcare industry. Additionally, the course introduces cells, tissues, and human anatomy highlighting essential physiological principles through a systemic approach. Students have the opportunity to acquire essential skills for accurate and logical communication, and interpretation of medical records.*	
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare or Principles of Pharmacy Tech	
Credits	2 semester course, 2 semesters required, 1 credit per semester, maximum of 2 credits	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Workplace Specialist: Dental Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12 ● Workplace Specialist: Dental Careers 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 101: Medical Terminology, HLHS 102: Essential Anatomy and Physiology	
VU Course Alignment	HIMT 110: Medical Terminology for Allied Health VU-EC – BIOL 107/L (Lab): Essentials of Human Anatomy and Physiology	
Four Yr. Course Alignment	BSU - NUR 101: Terminology for Health Care Professionals USI - HP 115: Medical Terminology for Health Professionals	
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711) VU - A.S. in Nursing (51.3801), C.G. Health Care Professional - Pre-Nursing CNA Track (51.3801) VU-EC - A.S. in Nursing (51.3801) USI – B.S. in Nursing (51.3801) BSU – B.S. Respiratory Therapy (51.0908)	
Liberal		

Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Medical Terminology***
5274.D1.1	Demonstrate the use of a medical dictionary.
5274.D1.2	Define and properly use prefixes and suffixes with word roots and combining forms to build medical terms.
5274.D1.3	Define medical terms.
5274.D1.4	Locate and identify the organs within body systems and define their basic functions.
5274.D1.5	Define and use medical abbreviations, signs, and symbols accurately.
5274.D1.6	Define common diseases and conditions.
5274.D1.7	Identify selected procedures, treatments, and diagnostic tests.
5274.D1.8	Spell medical terms correctly.
5274.D1.9	Pronounce medical terms.
Domain	***Essential Anatomy and Physiology***
5274.D2.1	Apply basic knowledge of chemistry as pertinent to the human body.
5274.D2.2	Identify the major body systems and the organs which comprise each of them.
5274.D2.3	Summarize and define the basic structure and function of each of the body systems.
5274.D2.4	Demonstrate the ability to utilize a microscope to examine prepared slides and apply physiological conditions and body systems.
5274.D2.5	Adapt the structural and functional aspects of cell organization to the body systems.
5274.D2.6	Classify the types and composition of the 4 basic types of body tissues.
5274.D2.7	Discuss and identify disease states in relation to body systems.

Central Service Technician Fundamentals	
Career Cluster	Health & Human Services
Program of Study	Central Service Technician
NLPS Sequence	C
Course Code	7163
Course Description	*The Central Service Technician Fundamentals course introduces students to the field of central service and prepares students to identify surgical instruments by category, type, and use. Students will learn the principles and importance of the flow of material along with the environmental control factors affecting the central service department. The student will differentiate between equipment management systems and compare out-sourcing and insourcing.*
Prerequisite(s)/	Principles of Healthcare

Corequisite(s)		
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation with exception of Nurse's Aide & Licensed Practical Nurse 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing 9-12 ● Workplace Specialist: Central Service Technician (Medical) 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	CSTC 102: Surgical Instrumentation, CSTC 105: Fundamentals of Central Service Technician Skills	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Central Service Technician (51.1012)	
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 112: Student Success in Healthcare	
Promoted Certifications		

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***CST Skills***
7163.D1.1	Describe the functions of the central supply department.
7163.D1.2	Differentiate between CST and CRCST
7163.D1.3	Trace the flow of materials
7163.D1.4	Examine environmental control factors
7163.D1.5	Use proper medical terminology
7163.D1.6	Practice total quality management

7163.D1.7	Practice safety and risk management
7163.D1.8	Practice inventory management
7163.D1.9	Apply information technology
7163.D1.10	Differentiate between management systems
7163.D1.11	Examine technology management
7163.D1.12	Analyze inventory methods
7163.D1.13	Discuss storage and inventory of sterile supplies
Domain	***Surgical Instrumentation***
7163.D2.1	Identify basic surgical instruments by type, function, and name.
7163.D2.2	Understand the importance of properly inspecting surgical instruments. Inspect surgical instruments.
7163.D2.3	Describe the use of surgical instruments.
7163.D2.4	Perform instrument sharpness testing.
7163.D2.5	Differentiate between reusable and discuss the reuse of single use medical devices.
7163.D2.6	Demonstrate the proper procedure for assembling instrument/procedure trays.
7163.D2.7	Differentiate between various types of specialty instrumentation utilized in operating rooms.

Central Service Technician Capstone		
Career Cluster	Health & Human Services	
Program of Study	Central Service Technician	
NLPS Sequence	D	
Course Code	7257	
Course Description	*The Central Services Technician Capstone course emphasizes the practice of sterilization skills that have been learned in previous courses. Students will focus on high and low sterilization methods. Students will differentiate between the various sterilization methods. Students will learn the protocol for controlling infection and the spread of blood borne pathogens. Additionally, this course will provide students the opportunity to complete practical hours toward the hours required for the completion of the International Association of Healthcare Central Services Material Management Certification Exam.*	
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare; Medical Terminology (Healthcare Fundamentals); Central Service Technician Fundamentals	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II

Bulletin 400	● No License Available
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation with exception of Nurse's Aide & Licensed Practical Nurse 9-12
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing 9-12 ● Workplace Specialist: Central Service Technician (Medical) 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	CSTC 107: Applications of Central Service Technician Skills; CSTC 108: Clinical Experiential Seminar; HLHS 105: Medical Law and Ethics
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Central Service Technician (51.1012)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 112: Student Success in Healthcare
Promoted Certifications	Certified Registered Central Service Technician (CRCST)
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Application of CST Skills***
7257.D1.1	Differentiate between the various sterilization methods.
7257.D1.2	Compare the different solutions used to sterilize.
7257.D1.3	Identify the procedure for sterilizing instruments after exposure to infectious diseases.
7257.D1.4	List steam, gas, and chemical sterilization components.
7257.D1.5	Define accepted processes for disinfection of equipment.
7257.D1.6	Differentiate between sterilization and disinfection.
7257.D1.7	Recognize the importance of sterile technique in the OR.
7257.D1.8	Discuss the procedure for loading and operating Washer /sterilizer.
7257.D1.9	Analyze the effectiveness of various types of transfer systems used in central processing departments.
7257.D1.10	Demonstrate the process of cleaning patient care equipment.
7257.D1.11	Demonstrate various techniques for wrapping packages.
7257.D1.12	Recognize the importance of microbiology for the central processing technician.
Domain	***Clinical Experience***
7257.D2.1	Discuss the responsibilities of the central process technician's management of patient care

	equipment
7257.D2.2	Understand the proper procedures for assembling and testing patient care equipment
7257.D2.3	Demonstrate proper cleaning of instruments and equipment by manual and mechanical processes.
7257.D2.4	Prepare equipment for terminal cleaning in a washer/sterilizer.
7257.D2.5	Demonstrate proper use of sterilizers including high temperature, low temperature, and point of use systems.
7257.D2.6	Wrap and package instrument trays
7257.D2.7	Demonstrate the proper handling of sterile supplies
7257.D2.8	Perform basic packaging procedures for peel pouches and flat wrapping materials Understand basic information about packaging and storage of sterile supplies.
7257.D2.9	Explain the various inventory replenishment systems used by central process. Define the term universal precautions and review its role in preventing the transmission of infectious organisms.
7257.D2.10	Discuss the advantages and disadvantages of purchase, rent, or loan options for patient care equipment.
Domain	***Medical Law and Ethics***
7257.D3.1	Explain how professional standards, laws, and ethics guide behavior for health care professionals in medical practices, hospitals, long term care facilities, clinics, and in emergency service settings.
7257.D3.2	Compare and contrast concepts related to ethics, bioethics, and law.
7257.D3.3	Discuss the United States legal system and processes as they relate to medical practice.
7257.D3.4	Describe the current health care environment including types of practices, licensing, and certification of health care professionals.
7257.D3.5	Defend the right of physicians and their patients as protected by federal and state laws.
7257.D3.6	Detail federal and state statutes pertinent to health care professionals in the areas of hiring and employment, safety, patient privacy and confidentiality, consumer protection, and public records/reporting.
7257.D3.7	Outline the public duties expected of physicians in the areas of reporting, legal records, management of controlled substances, and the Good Samaritan laws.
7257.D3.8	Outline appropriate risk management procedures in regard to minimizing litigation and practicing within legal boundaries.

Health & Human Services Certified Clinical Medical Assistant							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7168	Principles of Healthcare	5274	Healthcare Fundamentals	7164	Certified Clinical Medical Assistant (CCMA)	7255	Healthcare Specialist Capstone

Principles of Healthcare		
Career Cluster	Health & Human Services	
Program of Study	Central Service Technician, Certified Clinical Medical Assistant, Emergency Medical Services, Pharmacy, Pre-Nursing/Healthcare Specialist: Certified Nursing Aide (CNA)	
NLPS Sequence	A	
Course Code	7168	
Course Description	*Principles of Healthcare content examines skills common to specific health career topics such as patient nursing care, dental care, animal care, medical laboratory, public health, and an introduction to healthcare systems. Lab experiences are organized and planned around the activities associated with the student's career objectives.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course	HLHS 100: Intro to Healthcare, HLHS 104: CPR- Basic Life Support	

Alignment	
VU Course Alignment	HSGN 102: Introduction to Health Careers
Four Yr. Course Alignment	USI - HP 211: The Healthcare Delivery System, KIN 192: Concepts in Wellness and Fitness IUB - SPH B150: Introduction to Public Health
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711) VU - C.G. Health Care Professional - Pre-Nursing CNA Track (51.3801) IUB - B.S. in Public Health USI _ B.S. in Community and Public Health (51.0701)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Healthcare Systems***
7168.D1.1	Describe how health care is developed, delivered, and organized.
7168.D1.2	Discuss health care delivery systems and trends.
7168.D1.3	Identify ethical and legal issues in health care.
7168.D1.4	Apply basic medical terminology principles.
7168.D1.5	Identify the basic organization of the human body, the body systems, and the stages of growth and development.
7168.D1.6	Analyze behaviors for success in the health care field, including lifestyles management, professionalism, and lifelong learning.
7168.D1.7	Describe personal and workplace safety measures including body mechanics, infection control, and environmental safety.
7168.D1.8	Discuss principles of communication in a health care setting including treating the patient with respect as an individual, accommodation of cultural diversity, identifying and providing for patient needs.
7168.D1.9	Identify the purposes and procedures for medical documentation.
7168.D1.10	Compare various health care occupations, including education requirements, credentialing or licensing, scope of practice, and workforce data.
Domain	***CPR / Basic Life Support***
7168.D2.1	Recognize cardiac vascular emergencies and/or respiratory arrest and take appropriate action.
7168.D2.2	Establish an airway and initiate ventilation.
7168.D2.3	Manage obstructed airway in adult, child, and infant.
7168.D2.4	Perform one and two-person adult, child and infant CPR using universal precautions.
7168.D2.5	Demonstrate the use of an Automated External Defibrillator (AED)
Domain	***Wellness Knowledge***
7168.D3.1	Define fitness/wellness and the major areas it encompasses.
7168.D3.2	Assess individuals' level of fitness (including blood pressure, resting heart rate, flexibility, muscle strength and endurance, body composition, and aerobic capacity).

7168.D3.3	Learn safe and effective exercise routines with proper technique.
7168.D3.4	Design a personal health and fitness plan and a healthy eating plan to incorporate into a healthy lifestyle.
7168.D3.5	Develop a behavior modification plan that would encourage individuals to exercise.
7168.D3.6	Discuss the wellness wheel and interrelatedness of stress, nutrition, exercise, and weight management for a healthy quality of life.
7168.D3.7	Discuss lifestyle choices and their effect on fitness and wellness with regard to disease, disease prevention, and substance abuse (holistic, prescription, and illegal drugs).
7168.D3.8	Provide guidelines for prescribing lifestyle changes to improve levels of wellness/fitness.
Domain	***Wellness Knowledge***
7168.D3.1	Define fitness/wellness and the major areas it encompasses.
7168.D3.2	Assess individuals' level of fitness (including blood pressure, resting heart rate, flexibility, muscle strength and endurance, body composition, and aerobic capacity).
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7168.D3.7	Discuss lifestyle choices and their effect on fitness and wellness with regard to disease, disease prevention, and substance abuse (holistic, prescription, and illegal drugs).
7168.D3.8	Provide guidelines for prescribing lifestyle changes to improve levels of wellness/fitness.
Domain	***Career Navigation***
7168.D4.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7168.D4.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7168.D4.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7168.D4.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7168.D5.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7168.D5.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7168.D5.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7168.D5.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7168.D6.1	Demonstrate computer literacy skills and basic computer functions.
7168.D6.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.

7168.D6.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7168.D6.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Healthcare Fundamentals		
Career Cluster	Health & Human Services	
Program of Study	Central Service Technician, Certified Clinical Medical Assistant, Emergency Medical Services, Pharmacy, Pre-Nursing/Healthcare Specialist: Certified Nursing Aide (CNA)	
NLPS Sequence	B	
Course Code	5274	
Course Description	*Healthcare Fundamentals prepares students with language skills necessary for effective, independent use of health and medical reference materials. It includes the study of health and medical abbreviations, symbols, and Greek and Latin word part meanings, all taught within the context of body systems. This course builds skills in pronouncing, spelling, and defining new words encountered in verbal and written information in the healthcare industry. Additionally, the course introduces cells, tissues, and human anatomy highlighting essential physiological principles through a systemic approach. Students have the opportunity to acquire essential skills for accurate and logical communication, and interpretation of medical records.*	
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare or Principles of Pharmacy Tech	
Credits	2 semester course, 2 semesters required, 1 credit per semester, maximum of 2 credits	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Workplace Specialist: Dental Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12 ● Workplace Specialist: Dental Careers 9-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HLHS 101: Medical Terminology, HLHS 102: Essential Anatomy and Physiology
VU Course Alignment	HIMT 110: Medical Terminology for Allied Health VU-EC – BIOL 107/L (Lab): Essentials of Human Anatomy and Physiology
Four Yr. Course Alignment	BSU - NUR 101: Terminology for Health Care Professionals USI - HP 115: Medical Terminology for Health Professionals
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711) VU - A.S. in Nursing (51.3801), C.G. Health Care Professional - Pre-Nursing CNA Track (51.3801) VU-EC - A.S.in Nursing (51.3801) USI – B.S. in Nursing (51.3801) BSU – B.S. in Respiratory Therapy
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Medical Terminology***
5274.D1.1	Demonstrate the use of a medical dictionary.
5274.D1.2	Define and properly use prefixes and suffixes with word roots and combining forms to build medical terms.
5274.D1.3	Define medical terms.
5274.D1.4	Locate and identify the organs within body systems and define their basic functions.
5274.D1.5	Define and use medical abbreviations, signs, and symbols accurately.
5274.D1.6	Define common diseases and conditions.
5274.D1.7	Identify selected procedures, treatments, and diagnostic tests.
5274.D1.8	Spell medical terms correctly.
5274.D1.9	Pronounce medical terms.
Domain	***Essential Anatomy and Physiology***
5274.D2.1	Apply basic knowledge of chemistry as pertinent to the human body.
5274.D2.2	Identify the major body systems and the organs which comprise each of them.
5274.D2.3	Summarize and define the basic structure and function of each of the body systems.
5274.D2.4	Demonstrate the ability to utilize a microscope to examine prepared slides and apply to physiological conditions and body systems.
5274.D2.5	Adapt the structural and functional aspects of cell organization to the body systems.
5274.D2.6	Classify the types and composition of the 4 basic types of body tissues.
5274.D2.7	Discuss and identify disease states in relation to body systems.

Certified Clinical Medical Assistant (CCMA)	
Career Cluster	Health & Human Services
Program of Study	Certified Clinical Medical Assistant
NLPS Sequence	C
Course Code	7164
Course Description	*The Certified Clinical Medical Assistant (CCMA) course will prepare students for the National Healthcare Association CCMA exam. Instruction includes taking and recording vital signs, preparing patients for examination, patient education, and assisting the physician during the exam. The collecting and preparation of laboratory specimen and basic laboratory testing will be covered. The course prepares students for the administration of medication, venipuncture, ECG, and wound care and provides a basic understanding of the clinical and administrative duties and responsibilities pertinent to medical offices. Instruction in medical correspondence and records, case histories of patients, filing, telephone procedures, appointment scheduling, receptionist duties, and processing mail is also included. Written, verbal, and nonverbal communications according to patient needs are covered as well as documentation and associated legal and ethical boundaries.*
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare; Healthcare Fundamentals
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X (PCL/ CTE)
Additional Notes	Schools are strongly encouraged to offer the CCMA course along with Principles of Healthcare and Medical Terminology as part of a 3 period block of time.
ADDITIONAL COURSE INFO	
Funding	High Value | Level I
Bulletin 400	● No License Available
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation with exception of Nurse's Aide & Licensed Practical Nurse 9-12
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	MEAS 225: CCMA Workforce Development Prep
VU Course Alignment	

Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	Certified Clinical Medical Assistant (CCMA)

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Healthcare Systems***
7164.D1.1	Identify the roles and responsibilities, scope of practice, titles and credentials, and the licensing and certification process of the Medical Assistant (MA), other healthcare providers, and allied health personnel
7164.D1.2	Describe the various healthcare delivery models (HMOs, PPOs, POS, PCMH, accountable care organizations/payment for performance (ACOs), hospice, and collaborative care models).
7164.D1.3	Describe the differences between general and specialty services, ancillary and alternative therapies that that take place within the healthcare setting
7164.D1.4	Explain insurance fundamentals
Domain	***Medical Terminology***
7164.D2.1	Define and use common medical abbreviations, acronyms, and symbols accurately
7164.D2.2	Define and properly use prefixes and suffixes with word roots and combining forms to build medical terms
7164.D2.3	Define medical conditions, procedures, and instruments
7164.D2.4	Identify and use positional and directional terminology accurately
Domain	***Basic Pharmacology***
7164.D3.1	Identify commonly prescribed medications and approved abbreviations, forms of medication (pill, capsule, ointment), and discern between look alike/sound alike medications
7164.D3.2	Identify the classifications of medications including side effects, adverse effects, indications, and contraindications
7164.D3.3	Calculate proper measurement (metric and household), mathematical conversions, and dosage calculations
7164.D3.4	Explain routes of administration
7164.D3.5	Describe the processes involved with Pharmacokinetics (absorption, distribution, metabolism, and excretion).
7164.D3.6	Demonstrate an understanding of the rights of drug/medication administrations.
7164.D3.7	Use the Physicians' Desk Reference and online resources
7164.D3.8	Describe the principles of proper storage and disposal of medications.
Domain	***Nutrition***
7164.D4.1	Identify the nutrients necessary for good nutrition (general and related to diseases and conditions)
7164.D4.2	Explain the role vitamins and supplements play in nutrition and health wellness.
7164.D4.3	Demonstrate how to read food labels

7164.D4.4	Discuss disease states and treatments related to nutritional health
Domain	***Psychology***
7164.D5.1	Describe the developmental states of an individual, including end-of-life and stages of grief
7164.D5.2	Describe the psychology the physically disabled, developmentally delayed, and those with diseases
7164.D5.3	Explain how environmental and socio-economic stressors impact psychology of an individual
7164.D5.4	Explain the role mental health screening can play on the health of an individual
7164.D5.5	Identify defense mechanisms that impact the psychology of an individual.
Domain	***Essential Anatomy and Physiology***
7164.D6.1	Identify the anatomical structures, locations, and positions of the body structures and organ systems
7164.D6.2	Explain the structure and function of major body systems, and the interactions between organ systems
7164.D6.3	Describe the signs, symptoms, and etiology of common diseases, conditions, and injuries due to pathophysiology and disease processes.
7164.D6.4	Explain diagnostic measures and treatment modalities
7164.D6.5	Describe incidence, prevalence, risk factors, and factors leading to high mortality and morbidity
7164.D6.6	Explain epidemics and pandemics
7164.D6.7	Identify cell structures, common pathogens and nonpathogens, organisms and microorganisms, and infectious agents, chain of infection, and conditions for growth.
Domain	***Patient Care***
7164.D7.1	Identify patient
7164.D7.2	Prepare examination/procedure room
7164.D7.3	Ensure patient safety within the clinical setting
7164.D7.4	Complete a comprehensive clinical intake process, including the purpose of the visit
7164.D7.5	Measure vital signs
7164.D7.6	Obtain anthropomorphic measurements
7164.D7.7	Identify/document/report abnormal signs and symptoms
7164.D7.8	Assist provider with general physical examination
7164.D7.9	Assist provider with specialty examinations
7164.D7.10	Prepare patient for procedures
7164.D7.11	Prepare and administer medications and/or injectables using non parenteral and parenteral routes (excluding IV) (for example, oral, buccal, sublingual, intramuscular, intradermal, subcutaneous, topical, transdermal, and inhalation)
7164.D7.12	Perform staple and suture removal
7164.D7.13	Administer eye, ear, and topical medications
7164.D7.14	Perform ear and eye irrigation
7164.D7.15	Administer first aid and basic wound care
7164.D7.16	Identify and respond to emergency/priority situations
7164.D7.17	Perform CPR
7164.D7.18	Assist provider with patients presenting with minor and traumatic injury
7164.D7.19	Assist with surgical interventions (for example, sebaceous cyst removal, toenail removal,

	colposcopy, cryosurgery)
7164.D7.20	Review provider's discharge instructions/plan of care with patients
7164.D7.21	Follow guidelines for sending orders for prescriptions and refills by telephone, fax, or email
7164.D7.22	Document relevant aspects of patient care in patient record
7164.D7.23	Operate basic functions of an EHR/EMR system
7164.D7.24	Enter orders into CPOE
7164.D7.25	Identify Patient identifiers and elements of a patient medical/surgical/family/social history
7164.D7.26	Perform various methods for obtaining vital signs (manual & electronic blood pressure; respiration, temperature, pulse, pulse oximetry)
7164.D7.27	Recognize normal and abnormal vital signs
7164.D7.28	Perform methods for measuring height, weight, BMI; special considerations related to age, health, status, disability; growth chart
7164.D7.29	Understand and demonstrate positioning and draping requirements for general and specialty examinations, procedures, and treatments
7164.D7.30	Use various equipment, instruments, and supplies necessary to prepare the examination or procedure room, required equipment, supplies and instruments related to general physical examinations, and required equipment, supplies, and instruments related to specialty examinations
7164.D7.31	Demonstrate an understanding of immunization schedules and requirements
7164.D7.32	Record allergies (for example, common drug and non-drug allergies such as latex, bee stings; type of reactions [mild, moderate, and severe] how to respond to allergic reactions or anaphylactic shock)
7164.D7.33	Recognize the signs of infection
7164.D7.34	Utilize sterile techniques related to examinations, procedures, injections, and medication administration
7164.D7.35	Calculate dosage measurements related to oral medications and injectables
7164.D7.36	Explain commonly used oral and parenteral medications, including forms, packaging, routes of administration; rights of medication administration, and demonstrate techniques of administration
7164.D7.37	Describe storage; labeling; and medication logs, supplies and equipment related to injections, and storage of injectables
7164.D7.38	Demonstrate techniques and use of instruments for suture and staple removal, types, and sizes of sutures
7164.D7.39	Demonstrate methods of administration, techniques, procedures, and supplies related to eye, ear, and topical medications
7164.D7.40	Demonstrate use of instruments, supplies, and techniques related to eye and ear irrigation
7164.D7.41	Identify commonly occurring types of injuries (for example, lacerations, abrasions, fractures, sprains) and demonstrate treatment for commonly occurring types of injuries, (for example, bandaging, ice, elevation)
7164.D7.42	Identify commonly occurring types of surgical interventions and the signs and symptoms related to urgent and emergency situations (for example, diabetic shock, heat stroke, allergic reactions, choking, syncope, seizure)
7164.D7.43	Explain emergency action plans (for example, crash cart, emergency injectables)
7164.D7.44	Demonstrate procedures to perform CPR, basic life support and AED

Domain	Infection Control
7164.D8.1	Adhere to regulations and guidelines related to infection control
7164.D8.2	Adhere to guidelines regarding hand hygiene
7164.D8.3	Perform disinfection/sanitization
7164.D8.4	Perform sterilization of medical equipment
7164.D8.5	Perform appropriate aseptic techniques for various clinical situations
7164.D8.6	Perform Universal precautions and demonstrate proper hand-washing techniques
7164.D8.7	Explain Alcohol-based rubs/sanitizer
7164.D8.8	Describe infectious agents, modes of transmission, precautions for bloodborne pathogens
7164.D8.9	Demonstrate understanding of personal protective equipment (PPE)
7164.D8.10	Demonstrate sterilization techniques (autoclave, instrument cleaner, germicidal disinfectants, disposables) and techniques for medical and surgical asepsis
7164.D8.11	Order of cleaning and types of cleaning products
7164.D8.12	Demonstrate an understanding of Safety Data Sheets (SDS), cautions related to chemicals, disposal methods, and exposure control plan
7164.D8.13	Calibration of equipment and maintain logs (for example, maintenance, equipment servicing, temperature (refrigerator), quality control)
Domain	**Testing and Lab Procedures**
7164.D9.1	Collect non-blood specimens (for example, urine, stool, cultures, sputum)
7164.D9.2	Perform CLIA-waived testing (labs)
7164.D9.3	Perform vision and hearing tests
7164.D9.4	Perform allergy testing
7164.D9.5	Perform spirometry/pulmonary function tests (electronic or manual)
7164.D9.6	Recognize, document, and report normal and abnormal laboratory and test values
7164.D9.7	Match and label specimen to patient and completed requisition
7164.D9.8	Process, handle, and transport collected specimens
7164.D9.9	Point of care testing and information required on provider request or requisition form
7164.D9.10	Demonstrate specimen collection techniques and requirements
7164.D9.11	Explain CLIA-waived testing regulations and COLA accreditation standards
7164.D9.12	Explain Controls/calibration/quality control
7164.D9.13	Recognize normal and abnormal lab values and test values
7164.D9.14	Describe the elements related to vision and hearing tests including color, acuity/distance, visual fields; tone, speech and word recognition, tympanometry
7164.D9.15	Identify peak flow rates
7164.D9.16	Identify common allergens and demonstrate understanding of scratch test and intradermal allergy test
7164.D9.17	Describe Requirements for transportation, diagnosis, storage, and disposal of specimens, including patient identifiers, site or test
7164.D9.18	Perform content of requisition, including date and time, and ICD-10
Domain	**Phlebotomy**
7164.D10.1	Verify order details
7164.D10.2	Select appropriate supplies for test(s) ordered
7164.D10.3	Determine venipuncture site accessibility based on patient age and condition

7164.D10.4	Prepare site for venipuncture
7164.D10.5	Perform venipuncture
7164.D10.6	Perform capillary puncture
7164.D10.7	Perform post-procedural care
7164.D10.8	Handle blood samples as required for diagnostic purposes
7164.D10.9	Process blood specimens for laboratory
7164.D10.10	Match and label specimen to patient and completed requisition
7164.D10.11	Recognize and respond to abnormal test results
7164.D10.12	Prepare samples for transportation to a reference (outside) laboratory
7164.D10.13	Follow guidelines in distributing laboratory results to ordering providers after matching patient to provider
7164.D10.14	Patient identifiers, including site or test; and content of requisition
7164.D10.15	Requirements related to patient preparation for phlebotomy, including fasting/non-fasting
7164.D10.16	Assessment of patient comfort/anxiety level with procedure
7164.D10.17	Blood vacuum tubes required for chemistry, hematology, and microbiology testing
7164.D10.18	Blood-borne pathogens
7164.D10.19	Medical conditions or history and medications impacting collection of blood order of draw for venipuncture
7164.D10.20	Anatomy, skin integrity, venous sufficiency, contra-indications
7164.D10.21	Phlebotomy site preparation including cleansing, wrapping, order of draw with micro-tubes
7164.D10.22	Insertion and removal techniques
7164.D10.23	Evacuated tube, syringe, and butterfly methods
7164.D10.24	Types of tubes, tube positions, number of tube inversions, and fill level/ratios
7164.D10.25	Additives and preservatives
7164.D10.26	Bandaging procedures, including allergies and skin types
7164.D10.27	Pre-analytical considerations pertaining to specimen quality and consistency
7164.D10.28	Special collections (for example, timed specimens, drug levels, blood cultures, fasting)
7164.D10.29	Centrifuge and aliquot
7164.D10.30	Normal and abnormal test values, control values
7164.D10.31	Equipment calibration
7164.D10.32	Storage conditions related to sensitivity to light and temperature
7164.D10.33	Requirements for transportation, diagnosis, storage, disposal
7164.D10.34	Processing and labeling requirements
7164.D10.35	External databases (for example, outside labs, reference sources)
Domain	***EKG and Cardiovascular Testing***
7164.D11.1	Prepare patients for procedure
7164.D11.2	Perform cardiac monitoring (EKG, ECG) tests
7164.D11.3	Ensure proper functioning of EKG equipment
7164.D11.4	Recognize abnormal or emergent EKG results (for example, dysrhythmia, arrhythmia, versus artifact)
7164.D11.5	Assist provider with non-invasive cardiovascular profiling (for example, stress test, Holter monitoring, event monitoring)
7164.D11.6	Transmit results or report to patient's EMR or paper chart, and provider

7164.D11.7	Procedures and instructions to minimize artifacts
7164.D11.8	Artifacts, signal distortions, and electrical interference (for example, fuzz and wandering baseline)
7164.D11.9	Preparation, positioning, and draping of patient
7164.D11.10	Supplies (paper, proper leads)
7164.D11.11	Placement of limb and chest electrodes
7164.D11.12	Techniques and methods for EKGs
7164.D11.13	Signs of adverse reaction during testing (for example, signs of distress, elevated BP and respiration)
7164.D11.14	Calibration of equipment
7164.D11.15	Abnormal rhythms or dysrhythmias associated with cardiovascular testing
7164.D11.16	Waveforms, intervals, segment
Domain	***Patient Care Coordination***
7164.D12.1	Review patient record prior to visit to ensure health care is comprehensively addressed
7164.D12.2	Collaborate with healthcare providers and community-based organizations
7164.D12.3	Assist providers in coordinating care with community agencies for clinical and non-clinical services
7164.D12.4	Facilitate patient compliance (for example, continuity of care, follow up, medication compliance) to optimize health outcomes
7164.D12.5	Participate in transition of care for patients
7164.D12.6	Participate in team-based patient care (for example, patient centered medical home [PCMH], Accountable Care Organization [ACO])
7164.D12.7	Preventive medicine and wellness
7164.D12.8	Demonstrate an understanding of education delivery methods and instructional techniques and learning styles
7164.D12.9	Utilize resources and procedures to coordinate care outpatient services
7164.D12.10	Access available resources for clinical services (for example, home health care), available community resources for non-clinical services (for example, adult day care, transportation vouchers), and specialty resources for patient/family medical and mental needs
7164.D12.11	Complete referral forms and processes
7164.D12.12	Recognize barriers to care (for example, socio-economic, cultural differences, language, education)
7164.D12.13	Utilize tracking and reporting technologies
7164.D12.14	Identify roles and responsibilities of team members involved in patient centered medical home
Domain	***Administrative Assisting***
7164.D13.1	Schedule and monitor patient appointments using electronic and paper-based systems
7164.D13.2	Verify insurance coverage/financial eligibility
7164.D13.3	Identify and check patients in/out
7164.D13.4	Verify diagnostic and procedural codes
7164.D13.5	Obtain and verify prior authorizations and pre-certifications
7164.D13.6	Prepare documentation and billing requests using current coding guidelines
7164.D13.7	Ensure that documentation complies with government and insurance requirements

7164.D13.8	Perform charge reconciliation (for example, correct use of EHR software, entering charges, making adjustments, accounts receivable procedures)
7164.D13.9	Bill patients, insurers, and third-party payers for services performed
7164.D13.10	Resolve billing issues with insurers and third-party payers, including appeals and denials
7164.D13.11	Manage electronic and paper medical records
7164.D13.12	Facilitate/generate referrals to other healthcare providers and allied healthcare professionals
7164.D13.13	Provide customer service and facilitate service recovery (for example, follow up patient calls, appointment confirmations, monitor patient flow sheets, collect on accounts, make up for poor customer service)
7164.D13.14	Enter information into databases or spreadsheets (for example, Excel, EHR & EMR, billing modules, scheduling systems)
7164.D13.15	Participate in safety evaluations and report safety concerns
7164.D13.16	Maintain inventory of clinical and administrative supplies
7164.D13.17	Demonstrate competency with filing systems, scheduling software, recognition of urgency of appointment needs, telephone etiquette, and records management systems and software (for example, manual filing systems – alphabetical, numeric, office storage for archived files, EMR/EHR software applications)
7164.D13.18	Process legal requirements related to maintenance, storage, and disposal of records
7164.D13.19	Identify categories of the medical record (for example, administrative, clinical, billing, procedural, notes, consents)
7164.D13.20	Complete required documentation for patient review and signature, chart review, E-referrals (for example, how they are created, required information, how they are sent), financial eligibility, sliding scales, and indigent programs
7164.D13.21	Demonstrate competency in government regulations (for example meaningful use, MACRA), CMS billing requirements, and Third-party payer billing requirements, Advanced beneficiary notice (ABN)
7164.D13.22	Specialty pharmacies (for example, compounding and nuclear pharmacies; forms of medication available such as liquid, elixir, balm, ointment)
7164.D13.23	Define insurance terminology (for example, co-pay, co-insurance, deductible, tier levels, explanation of benefits
7164.D13.24	Process aging reports, collections due, adjustments and write-offs, online banking for deposits and electronic transfers, authorizations to approve payment processing, auditing methods, processes, and signoffs, and Data entry and data fields
7164.D13.25	Complete equipment inspection logs, required schedules, and compliance requirements, including inspection by medical equipment servicers
Domain	***Communication and Customer Service***
7164.D14.1	Modify verbal and non-verbal communication for diverse audiences (for example providers, coworkers, supervisors, patients and caregivers, external providers)
7164.D14.2	Modify verbal and non-verbal communications with patients and caregivers based on special considerations (for example pediatric, geriatric, hearing impaired, vision impaired, mentally handicapped or disabled)
7164.D14.3	Clarify and relay communications between patients and providers
7164.D14.4	Communicate on the telephone with patients and caregivers, providers, third party payers
7164.D14.5	Prepare written/electronic communications/business correspondence
7164.D14.6	Handle challenging/difficult customer service occurrences

7164.D14.7	Engage in crucial conversations (with patients and caregivers/healthcare surrogates, staff, and providers)
7164.D14.8	Facilitate and promote teamwork and team engagement
7164.D14.9	Recognize patient characteristics impacting communication (for example, cultural differences and language barriers, cognitive level, developmental stage; sensory and physical disabilities; age)
7164.D14.10	Define all medical terminology and jargon, layman's terms
7164.D14.11	Demonstrate proficiency in therapeutic communication, interviewing and questioning techniques, including screening questions, open-, closed-, probing questions, and scope of permitted questions and boundaries for questions, active listening, communication cycle (clear, concise message relay), coaching and feedback, positive reinforcement of effective behavior
7164.D14.12	Demonstrate professional presence (for example, appearance, demeanor, tone
7164.D14.13	Process patient satisfaction surveys
7164.D14.14	Recognize when to escalate problem situations
7164.D14.15	Perform techniques to deal with patients (for example, irate clients, custody issues between parents, chain of command)
7164.D14.16	Prepare incident/event/unusual occurrence reports; documentation of event
7164.D14.17	Understand Cause-and-effect analysis (for example, anxiety increases blood pressure or heart rate; risk management related to patient and employee safety [reviewing the design, setting/population, protocols, measurements of a facility to ensure overall patient and employee safety])
7164.D14.18	Demonstrate Email etiquette and telephone etiquette
7164.D14.19	Utilize Business letter formats
Domain	***Medical Law and Ethics***
7164.D15.1	Comply with legal and regulatory requirements
7164.D15.2	Adhere to professional codes of ethics
7164.D15.3	Obtain, review, and comply with medical directives
7164.D15.4	Obtain and document healthcare proxies and agents
7164.D15.5	Provide, collect, and store MOLST forms (medical order for life sustaining treatment)
7164.D15.6	Protect patient privacy and confidentiality, including medical records
7164.D15.7	Adhere to legal requirements regarding reportable violations or incidents
7164.D15.8	Identify personal or religious beliefs and values and provide unbiased care
7164.D15.9	Process an informed consent, advanced directives (for example, living will, DNR/DNI), and power of attorney
7164.D15.10	Demonstrate proper storage of medical records
7164.D15.11	Demonstrate competency in the conditions for sharing information/release of information, criminal and civil acts, and medical malpractice, mandatory reporting laws, triggers for reporting and reporting agencies, and the Hippocratic Oath

Healthcare Specialist Capstone		
Career Cluster	Health & Human Services	
Program of Study	Certified Clinical Medical Assistant, Pre-Nursing/Healthcare Specialist: Certified Nursing Aide (CNA), Emergency Medical Services	
NLPS Sequence	D	
Course Code	7255	
Course Description	*The Healthcare Specialist Capstone course will facilitate healthcare students' acquisition of additional knowledge and skills necessary to work in a variety of healthcare settings beyond a long term care facility including hospitals, doctors' offices, and clinics. Students can accomplish this goal by completing coursework that will cover topics such as Medical Law and Ethics, Electronic Health Records, and/or Behavioral Health. Schools may offer additional healthcare certifications such as the Certified Clinical Medical Assistant (CCMA) or Phlebotomy along with the coursework or in place of the coursework.*	
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare; Healthcare Fundamentals; Healthcare Specialist: CNA, EMT or Certified Clinical Medical Assistant (CCMA)	
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation: First Responder 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Emergency Medical Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 105: Medical Law and Ethics, HLHS 122: Electronic Health Records, HLHS 125: Behavioral Health	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711)	

Liberal Arts/Sciences Requirements	
Promoted Certifications	Certified Medical Assistant (CMA)

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Medical Law and Ethics***
7255.D1.1	Explain how professional standards, laws, and ethics guide behavior for health care professionals in medical practices, hospitals, long term care facilities, clinics, and in emergency service settings.
7255.D1.2	Compare and contrast concepts related to ethics, bioethics, and law.
7255.D1.3	Discuss the United States legal system and processes as they relate to medical practice.
7255.D1.4	Describe the current health care environment including types of practices, licensing, and certification of health care professionals.
7255.D1.5	Defend the right of physicians and their patients as protected by federal and state laws.
7255.D1.6	Detail federal and state statutes pertinent to health care professionals in the areas of hiring and employment, safety, patient privacy and confidentiality, consumer protection, and public records/reporting.
7255.D1.7	Outline the public duties expected of physicians in the areas of reporting, legal records, management of controlled substances, and the Good Samaritan laws.
7255.D1.8	Outline appropriate risk management procedures regarding minimizing litigation and practicing within legal boundaries.
Domain	***Electronic Health Records***
7255.D2.1	Acquire, store, and retrieve patient information from the EHR database.
7255.D2.2	Execute, manage EHR database and maintain software and hardware including updates and file maintenance (e.g., purging, archiving).
7255.D2.3	Operate integrated devices with EHR software (e.g., scanners, fax machine, signature pads, and cameras) to transmit patient data for external use (e.g., insurance, pharmacies, and other providers).
7255.D2.4	Access clinical vocabularies in a health information system when appropriate and comply with patient safety standards regarding abbreviations in the health information system.
7255.D2.5	Generate Insurance verifications, patient statements, encounter forms/super bills, and face/admission sheets.
7255.D2.6	Retrieve diagnosis and procedural descriptions from medical records, enter codes and billing information into the EHR, and post payments to patient accounts at the time of visit.
7255.D2.7	Understand how to find codes in the ICD, CPT and HCPCS manuals.
7255.D2.8	Review charts to ensure compliance of proper charting, report to the proper enforcement office, and document the link between effective charting and reimbursement for procedures performed by clinicians.
7255.D2.9	Adhere to professional standards of care, including HIPAA Privacy & Security Rules and facility policy, as they pertain to medical records.
7255.D2.10	Generate reports for clinical and financial resources (e.g., aging report and financial analysis).
7255.D2.11	Compile and maintain medical care and census data for continuity of care records (e.g.,

	reports on diseases treated, surgery performed, and use of hospital beds for clinical audits).
7255.D2.12	Provide ongoing end-user training and technical support of EHR software.
7255.D2.13	Execute EHR workflow, patient flow within the office (e.g., scheduling, patient registration and verification, patient referrals.
7255.D2.14	Use proper privileges and develop clinical templates from existing searchable databases.
Domain	***Behavioral Health***
7255.D3.1	Identify theories and demonstrate fundamental knowledge of biological, sociological, cultural, psychological, and spiritual development across the adult lifespan.
7255.D3.2	Define and discuss the impact of culture, diversity, and social justice as they pertain to perception and treatment of behavioral health concerns and aging.
7255.D3.3	Examine lifestyle behaviors associated with the development of chronic behavioral health illnesses.
7255.D3.4	Discuss and identify treatment options, pharmacological and non-pharmacological interventions of psychological and behavioral disorders for the following: Anxiety, Stress Disorders, Disorders of Mood, Eating Disorders, Substance Use and Addictive Disorders, Disorders of Aging and Cognition, exhibiting expression or indications of distress (i.e., anxiety, striking out, self-isolating, etc.)
7255.D3.5	Identify types and classes of drugs related to the treatment of selected behaviors and abnormal behaviors, including potential complications from drug interactions.
7255.D3.6	Discuss and define parameters of therapeutic touch and communication.
7255.D3.7	Demonstrate general and specific verbal interventions used to support patient treatment and recovery.
7255.D3.8	Demonstrate understanding of caregiver behaviors which support low conflict interactions with patients.
7255.D3.9	Identify strategies for behavioral health promotion and interprofessional collaborative practice when interacting with patients with behavioral health issues.
7255.D3.10	Describe and discuss the dying process, the definition of death, and the stages of grief as they apply to caregivers.
Domain	***Healthcare Specialist Certifications***
7255.D4.1	Certified Nursing Assistant (CNA)
7255.D4.2	Emergency Medical Technician (EMT)
7255.D4.3	Certified Clinical Medical Assistant (CCMA)
7255.D4.4	Phlebotomy (dual enrollment only)
7255.D4.5	Electrocardiography (dual enrollment only)

Health & Human Services Cosmetology and Barbering							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7330	Principles of Barbering and Cosmetology	7331	Barbering and Cosmetology Fundamentals	7332	Advanced Cosmetology	7334	Barbering and Cosmetology Capstone
				7333	Advanced Barbering		

Principles of Barbering and Cosmetology		
Career Cluster	Health and Human Services	
Program of Study	Cosmetology and Barbering	
NLPS Sequence	A	
Course Code	7330	
Course Description	*Principles of Barbering and Cosmetology offers an introduction to cosmetology with emphasis on basic practical skills and theories including roller control, quick styling, shampooing, hair coloring, permanent waving, facials, manicuring, business and personal ethics, and bacteriology and sanitation. Successful completion of the course requires at least 375 Cosmetology studio hours.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X	
Additional Notes	Principles and Fundamentals should be concurrently enrolled if offering for Dual Credits. This course may require extended hours of participation in order to meet the 1500 hours required for the Cosmetology and Barbering exams.	
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Cosmetology K-12	
Rules 46-47	● Standard Trade & Industrial: Cosmetology 9- 12 ● Occupational Specialist I, II or III: Cosmetology 9-12	
Rules 2002	● CTE: Trade & Industrial: Cosmetology ● Workplace Specialist: Cosmetology	
REPA/REPA 3	● CTE: Trade & Industrial Cosmetology 5- 12	

	● Workplace Specialist: Cosmetology 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Professionalism in the Cosmetology Field***
7330.D1.1	Explain the history of cosmetology and barbering
7330.D1.2	Understand the importance of Life Skills
7330.D1.3	Practice Professional Image
7330.D1.4	Evaluate the elements involved in presenting a professional image
7330.D1.5	Evaluate effective verbal and non-verbal communication techniques to successfully interact with clients and peers
7330.D1.6	Demonstrate a successful client consultation
7330.D1.7	Establish and practice the ergonomic posture steps to prevent injury while working
7330.D1.8	Communicate Effectively in the workplace for Success
Domain	***Sanitation, Bacteriology and Sterilization***
7330.D2.1	Discuss infectious materials transmission in the barbershop.
7330.D2.2	Understand reasons for maintaining MSDS notebooks.
7330.D2.3	Discuss federal and state agencies associated with infection control and safe work practices.
7330.D2.4	Define and discuss the three levels of decontamination. Identify commonly used chemical agents.
7330.D2.5	Demonstrate proper decontamination procedures for tools, equipment, and surfaces.
7330.D2.6	Discuss standard precautions and blood-spill disinfection.
7330.D2.7	Discuss disinfecting rules, decontamination safety precautions, and rules of sanitation. Define safe work practices.
7330.D2.8	Recognize potential safety hazards in the shop.
7330.D2.9	Practice Infection Control Procedures

7330.D2.10	Demonstrate appropriate sanitation precautions and first aid procedures to ensure proper salon standards
7330.D2.11	Apply sanitation procedures to maintain state health guidelines and a professional salon
7330.D2.12	Analyze the different parasites, bacteria and viruses and their relationship to the spread of infection in salons and clients
7330.D2.13	Demonstrate proper first aid techniques to use on cuts and burns
7330.D2.14	Apply safe handling techniques in the use of disinfectant products as a salon professional
7330.D2.15	Apply universal precautions and professional responsibilities as a salon professional
7330.D2.16	Identify potential hazards involving bloodborne pathogens.
Domain	***Shampoo and Massage***
7330.D3.1	Explore proper draping procedures for hair services
7330.D3.2	Practice the shampoo service.
7330.D3.3	Identify scalp massage techniques and treatments
7330.D3.4	Recognize incline method recline method of shampoo service.
7330.D3.5	Practice shampooing, rinsing, and conditioning of hair
7330.D3.6	Safely and effectively Shampoo, Rinse, and Condition hair of all types
7330.D3.7	Demonstrate basic knowledge of various classifications of products and cosmetics used in the industry
7330.D3.8	Evaluate draping and scalp massage as it relates to hair care
7330.D3.9	Explore the hair as it pertains to formation, growth, structure, behavior, and how hair gains color
Domain	***Design Decisions***
7330.D4.1	Learn the principals of hair design to create hair styles
7330.D4.2	Demonstrate mastery of the basic design elements and principles used to create design styles
7330.D4.3	Explore ways to design hair styles to enhance, or camouflage facial features
7330.D4.4	Explore different facial shapes and proportions and their role in hair design and facial hair design
7330.D4.5	Define the Elements of Hair Design
Domain	***Haircutting***
7330.D5.1	Demonstrate a basic understanding of haircutting techniques
7330.D5.2	Identify appropriate and essential hair cutting tools
7330.D5.3	Explore various haircuts including solid form, increased layered, graduated form, uniformed layer, combination, business, man, and clipper
7330.D5.4	Recognize and explore haircuts to understand the importance of the proper cut and its effect on the overall hair design
7330.D5.5	Understand the basic principles of Haircutting
7330.D5.6	Practice Effective Client Consultation for Haircutting

7330.D5.7	Effectively use Clippers and Trimmers
Domain	***Chemical Texturizing***
7330.D6.1	Define chemical texturizing of hair and its usage in the salon space
7330.D6.2	Explore hair analysis in order to perform appropriate chemical texturizing
7330.D6.3	Explore perm wrap techniques for creating hairstyles
7330.D6.4	Understand the chemical relaxing processes in creating hairstyles
7330.D6.5	Examine curl reforming in creating hairstyles
Domain	***Hair Coloring***
7330.D7.1	Demonstrate an understanding of hair coloring techniques
7330.D7.2	Explain color theory and the law of color as it relates to hair color
7330.D7.3	Understand existing hair color of a client as it relates to additional color considerations
7330.D7.4	Recognize the different types of Hair Color
7330.D7.5	Conduct a Hair color Consultation
7330.D7.6	Learn the Special Challenges in Hair color and Corrective Solutions
7330.D7.7	Understand Hair coloring Safety Precautions
Domain	***Manicuring and Pedicuring***
7330.D8.1	Understand nail structure and growth in fingernails and toenails
7330.D8.2	Discuss disorders, diseases, and irregularities of fingernails and toenails
7330.D8.3	Explain proper skills and procedures, and sanitary precautions for a manicure and pedicure
7330.D8.4	Understand basic procedures for applying artificial nails including tips, wraps, acrylic nails and gels
7330.D8.5	Discuss the Anatomy of the Hand and Arm and its impact on manicures
7330.D8.6	Practice Manicures and Pedicures and how to do them effectively and efficiently
7330.D8.7	Learn basic Nail Techniques
Domain	***Career Navigation***
7330.D9.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7330.D9.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7330.D9.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7330.D9.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7330.D10.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7330.D10.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.

7330.D10.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7330.D10.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7330.D11.1	Demonstrate computer literacy skills and basic computer functions.
7330.D11.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7330.D11.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7330.D11.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Barbering and Cosmetology Fundamentals		
Career Cluster	Health and Human Services	
Program of Study	Cosmetology and Barbering	
NLPS Sequence	B	
Course Code	7331	
Course Description	*Barbering and Cosmetology Fundamentals focuses on the development of practical skills introduced in Principles of Barbering and Cosmetology. Clinical application and theory in the science of barbering and cosmetology are introduced. Successful completion of the course requires at least 375 Cosmetology studio hours.*	
Prerequisite(s)/ Corequisite(s)	Principles of Barbering and Cosmetology	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X	
Additional Notes	Principles and Fundamentals should be concurrently enrolled. This course may require extended hours of participation in order to meet the 1500 hours required for the Cosmetology and Barbering exams.	
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Cosmetology K-12	
Rules 46-47	● Standard Trade & Industrial: Cosmetology 9- 12 ● Occupational Specialist I, II or III: Cosmetology 9-12	
Rules 2002	● CTE: Trade & Industrial: Cosmetology ● Workplace Specialist: Cosmetology	
REPA/REPA 3	● CTE: Trade & Industrial Cosmetology 5- 12	

	● Workplace Specialist: Cosmetology 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	COSM 100: Cosmetology I
Four Yr. Course Alignment	
Postsecondary Credential	A.S. in Cosmetology Management (12.0401)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Sanitation, Bacteriology and Sterilization***
7331.D1.1	Apply proper decontamination procedures for tools, equipment, and surfaces.
7331.D2.2	Practice and apply proper sanitation precautions, first aid procedures and sanitation procedures to maintain state health guidelines and a professional salon
7331.D2.3	Evaluate the different parasites, bacteria and viruses and their relationship to the spread infection in salons and clients
7331.D2.4	Uphold proper first aid techniques to use on cuts and burns
7331.D2.5	Practice safe handling techniques in the use of disinfectant products as a salon professional
7331.D2.6	Utilize universal precautions and professional responsibilities as a salon professional
7331.D2.7	Understand the potential hazards involving bloodborne pathogens.
Domain	***Anatomy***
7331.D2.1	Explain the importance of anatomy and physiology to the cosmetology/barbering profession. Describe the structure and reproduction of cells.
7331.D2.2	Describe the structure of the skull, face, and neck and their relationship to cosmetology/barbering.
7331.D2.3	Identify important muscles of the head, face, and neck related to barbering services.
7331.D2.4	Identify important nerves of the head, face, and neck related to barbering services.
7331.D2.5	Know the General Anatomy and Physiology to identify disorders and diseases.
7331.D2.6	Analyze the anatomy and physiology of the human body as it relates to the cosmetology and barbering professions.

7331.D2.7	Analyze systems and organs of the human body and their functions to understand how the body works
7331.D2.8	Analyze the structure and function of cells, tissues, organs, and body systems to understand the building blocks of the body
7331.D2.9	Evaluate the structure and functions of the skeletal, muscular, and nervous systems to understand the basic body systems
7331.D2.10	Compare the circulatory, digestive, excretory, and respiratory systems in relation to each other and their role in the human body
Domain	***Electricity and Light Therapy***
7331.D3.1	Identify and define common electrical terms.
7331.D3.2	Discuss and recognize electrical safety devices.
7331.D3.3	Explain different electrical modalities and their uses.
7331.D3.4	Explain the effects of ultraviolet and infrared light on the skin.
7331.D3.5	Evaluate the nature of electricity and its uses as it relates cosmetology and barbering.
7331.D3.6	Analyze electromagnetic radiation and the visible spectrum of light to understand light therapy treatments
Domain	***Chemistry***
7331.D4.1	Define organic and inorganic chemistry.
7331.D4.2	Define matter and its states.
7331.D4.3	Define pH and understand the pH scale.
7331.D4.4	Define organic and inorganic chemistry. Explain the characteristics of emulsions, suspensions, and solutions.
7331.D4.5	Understand how the pH levels of hair products affect the hair and scalp.
7331.D4.6	Discuss cosmetic preparations used in barbering including shampoos, conditioners, rinses, and tonics.
7331.D4.7	Recognize the basics of chemistry and electricity and how it influences cosmetology and barbering
7331.D4.8	Analyze principals of Chemistry and Electricity as they relate to cosmetology and barbering
7331.D4.9	Evaluate matter, the pH scale, and the chemistry of cosmetics to understand their relationship to cosmetology procedures
Domain	***Shampoo, Massage and Scalp***
7331.D5.1	Identify proper draping procedures for hair services
7331.D5.2	Practice scalp massage techniques and treatments
7331.D5.3	Demonstrate incline method recline method of shampoo service.
7331.D5.4	Illustrate skill mastery in shampooing, rinsing, and conditioning of hair
7331.D5.5	Demonstrate advanced knowledge of various classifications of products and cosmetics used in the industry
7331.D5.6	Practice draping and scalp massage as it relates to hair care

7331.D5.7	Appraise hair as it pertains to formation, growth, structure, behavior, and how hair gains color
7331.D5.8	Practice services are associated with the treatment of the hair and scalp.
Domain	***Properties and Disorders of the Skin***
7331.D6.1	Describe the structure and divisions of the skin.
7331.D6.2	List the functions of the skin.
7331.D6.3	Identify recognizable skin disorders.
7331.D6.4	Evaluate skin disorders to understand how to handle them in relation to your role in cosmetology/barbering.
Domain	***Haircutting***
7331.D7.1	Identify the principal tools and implements used in the practice of barbering and cosmetology.
7331.D7.2	Identify the parts of the shears, clippers, and razors.
7331.D7.3	Demonstrate the correct techniques for holding combs, shears, clippers, and razors.
7331.D7.4	Demonstrate honing and stropping techniques.
Domain	***Properties of the Scalp and Hair***
7331.D8.1	Evaluate trichology as it relates to cosmetology and barbering
7331.D8.2	Evaluate the properties of the hair and scalp
7331.D8.3	Perform a thorough Hair and Scalp Analysis

Advanced Cosmetology	
Career Cluster	Health and Human Services
Program of Study	Cosmetology and Barbering
NLPS Sequence	C
Course Code	7332
Course Description	*Advanced Cosmetology will emphasize the development of advanced skills in styling, hair coloring, permanent waving, facials, manicuring, chemical texturizing, and hair cutting techniques. Students will also further study anatomy and physiology as it applies to hair care professions. Successful completion of the course requires at least 375 studio hours.*
Prerequisite(s)/ Corequisite(s)	Principles of Barbering and Cosmetology; Barbering and Cosmetology Fundamentals
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a Directed Elective or Elective for all diplomas
Dual Credit Status	X
Additional Notes	This course should be coenrolled with TSD. This course may require extended hours of participation in order to meet the 1500 hours required for the Cosmetology and Barbering

	exams.
ADDITIONAL COURSE INFO	
Funding	Less than Moderate Value | Level I
Bulletin 400	● Standard Trade & Industrial: Cosmetology K-12
Rules 46-47	● Standard Trade & Industrial: Cosmetology 9-12 ● Occupational Specialist I, II or III: Cosmetology 9-12
Rules 2002	● CTE: Trade & Industrial: Cosmetology ● Workplace Specialist: Cosmetology
REPA/REPA 3	● CTE: Trade & Industrial Cosmetology 5-12 ● Workplace Specialist: Cosmetology 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	COSM 150: Cosmetology II
Four Yr. Course Alignment	
Postsecondary Credential	A.S. in Cosmetology Management (12.0401)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Design Decisions***
7332.D1.1	Apply the principles of hair design to create hair styles
7332.D1.2	Demonstrate mastery of the design elements and principles used to create design styles
7332.D1.3	Demonstrate how to design hair styles to enhance, or camouflage facial features
7332.D1.4	Examine different facial shapes and proportions and their role in hair design and facial hair design
7332.D1.5	Define the Elements of Hair Design
Domain	***Haircutting***
7332.D2.1	Demonstrate mastery of haircutting techniques
7332.D2.2	Choose appropriate and essential hair cutting tools
7332.D2.3	Demonstrate mastery of various haircuts including solid form, increased layered, graduated form, uniformed layer, combination, business, man, and clipper

7332.D2.4	Evaluate and critique haircuts to understand the importance of the proper cut and its effect on the overall hair design
7332.D2.5	Understand the basic principles of Haircutting
7332.D2.6	Conduct an Effective Client Consultation for Haircutting
7332.D2.7	Effectively use Clippers and Trimmers
Domain	***Hairstyling***
7332.D3.1	Demonstrate mastery of hairstyling techniques
7332.D3.2	Learn the basics of wet Hairstyling
7332.D3.3	Master Comb-Out Techniques of Hairstyling
7332.D3.4	Perform Formal Styling
7332.D3.5	Understand the Principles of Hair Design
Domain	***Chemical Texturizing***
7332.D4.1	Demonstrate mastery of chemical texturizing of hair
7332.D4.2	Demonstrate mastery of hair analysis to perform appropriate chemical texturizing
7332.D4.3	Demonstrate mastery of perm wrap techniques in creating hairstyles
7332.D4.4	Demonstrate mastery of chemical relaxing processes in creating hairstyles
7332.D4.5	Demonstrate mastery of curl reforming in creating hairstyles
Domain	***Hair Coloring***
7332.D5.1	Demonstrate mastery of hair coloring techniques
7332.D5.2	Evaluate color theory and the law of color as it relates to hair color
7332.D5.3	Evaluate existing hair color of a client as it relates to additional color considerations
7332.D5.4	Understand the type of Hair Color
7332.D5.5	Conduct an Effective Hair color Consultation
7332.D5.6	Understand the Special Challenges in Hair color and Corrective Solutions
7332.D5.7	Know Hair coloring Safety Precautions
Domain	***Additional Standards***
7332.D6.1	Demonstrate competency in braiding
7332.D6.2	Explain how to prepare the hair for braiding and cornrow
7332.D6.3	Explain the difference between human hair and synthetic hair
7332.D6.4	Describe the two basic categories of wigs
7332.D6.5	Describe several types of hairpieces and their uses
7332.D6.6	Explain several different methods of attaching hair extensions

Advanced Barbering		
Career Cluster	Health and Human Services	
Program of Study	Cosmetology and Barbering	
NLPS Sequence	C	
Course Code	7333	
Course Description	*Advanced Barbering is a course with a focus particularly on barbering styles and techniques. The emphasis will be toward the development of advanced skills in shaving, hair cutting, styling, facials and facial hair care, hair coloring, and chemical texturizing. Students will also study anatomy and physiology as it applies to barbering. Upon completion of the course requirements, the students will be able to perform basic manipulative skills including haircutting, hairstyling, chemical texturizing, shaving, treatment of the skin and scalp, salon management, license laws, sanitation and retain knowledge relating to the history of barbering. Successful completion of the course requires at least 375 Barbering studio hours.*	
Prerequisite(s)/ Corequisite(s)	Principles of Barbering and Cosmetology; Barbering and Cosmetology Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X	
Additional Notes	This course should be coenrolled with TSD. This course may require extended hours of participation in order to meet the 1500 hours required for the Cosmetology and Barbering exams.	
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Cosmetology K-12	
Rules 46-47	● Standard Trade & Industrial: Cosmetology 9-12 ● Occupational Specialist I, II or III: Cosmetology 9-12	
Rules 2002	● CTE: Trade & Industrial: Cosmetology ● Workplace Specialist: Cosmetology	
REPA/REPA 3	● CTE: Trade & Industrial Cosmetology 5-12 ● Workplace Specialist: Cosmetology 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment	COSM 150: Cosmetology II	
Four Yr. Course Alignment		
Postsecondary	Professional Barbering License (12.0401)	

Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***History of Barbering***
7333.D1.1	Define the origin of the word barber.
7333.D1.2	Discuss the evolution of barbering.
7333.D1.3	Describe the barber-surgeons and their practices.
7333.D1.4	Explain the origin of the barber pole.
7333.D1.5	Identify some organizations responsible for upgrading the barbering profession.
Domain	***Haircutting***
7333.D2.1	Discuss the art and science of men's haircutting and styling.
7333.D2.2	Discuss the term envisioning and the importance of the client consultation.
7333.D2.3	Discuss facial shapes and anatomical features.
7333.D2.4	Identify and name the sections of the head as applied to haircutting.
7333.D2.5	Understand fundamental terms used in haircutting.
7333.D2.6	Identify the principal tools and implements used in the practice of barbering.
7333.D2.7	Identify the parts of the shears, clippers, and razors.
7333.D2.8	Demonstrate the correct techniques for holding combs, shears, clippers, and razors.
7333.D2.9	Demonstrate honing and stropping techniques.
7333.D2.10	Demonstrate the performance of the following cutting techniques: fingers-and-shear, shear-over comb, freehand shear cutting, freehand clipper cutting, clipper-over-comb, and razor cutting.
7333.D2.11	Demonstrate shaving the outline areas.
7333.D2.12	Demonstrate disinfection procedures.
7333.D2.13	Demonstrate basic hairstyling techniques.
Domain	***Shaving and Facial Hair Design***
7333.D3.1	Discuss safety precautions used in haircutting and styling.
7333.D3.2	Discuss sanitation and safety precautions associated with straight razor shaving.
7333.D3.4	Demonstrate the ability to perform straight razor positions and cutting strokes.
7333.D3.5	Identify the 14 shaving areas of the face.
7333.D3.6	Demonstrate a facial shave.
7333.D3.7	Demonstrate a neck shave.
7333.D3.8	Demonstrate a mustache and beard trim.
Domain	***Hairstyling***

7333.D4.1	Demonstrate mastery of hairstyling techniques
7333.D4.2	Learn the basics of wet Hairstyling
7333.D4.3	Master Comb-Out Techniques of Hairstyling
7333.D4.4	Perform Formal Styling
7333.D4.5	Understand the Principles of Hair Design
Domain	***Design Decisions***
7333.D5.1	Apply the principles of hair design to create hair styles
7333.D5.2	Demonstrate mastery of the design elements and principles used to create design styles
7333.D5.3	Demonstrate how to design hair styles to enhance, or camouflage facial features
7333.D5.4	Examine different facial shapes and proportions and their role in hair design and facial hair design
7333.D5.5	Define the Elements of Hair Design
Domain	***Chemical Texturizing***
7333.D6.1	Demonstrate mastery of chemical texturizing of hair
7333.D6.2	Demonstrate mastery of hair analysis to perform appropriate chemical texturizing
7333.D6.3	Demonstrate mastery of perm wrap techniques in creating hairstyles
7333.D6.4	Demonstrate mastery of chemical relaxing processes in creating hairstyles
7333.D6.5	Demonstrate mastery of curl reforming in creating hairstyles
Domain	***Hair Coloring***
7333.D7.1	Demonstrate mastery of hair coloring techniques
7333.D7.2	Evaluate color theory and the law of color as it relates to hair color
7333.D7.3	Evaluate existing hair color of a client as it relates to additional color considerations
7333.D7.4	Understand the type of Hair Color
7333.D7.5	Conduct an Effective Hair color Consultation
7333.D7.6	Understand the Special Challenges in Hair color and Corrective Solutions
7333.D7.7	Know Hair coloring Safety Precautions
Domain	***Additional Standards***
7333.D8.1	Demonstrate competency in braiding
7333.D8.2	Explain how to prepare the hair for braiding and cornrow
7333.D8.3	Explain the difference between human hair and synthetic hair
7333.D8.4	Describe the two basic categories of wigs
7333.D8.5	Describe several types of hairpieces and their uses
7333.D8.6	Explain several different methods of attaching hair extensions

Barbering and Cosmetology Capstone		
Career Cluster	Health and Human Services	
Program of Study	Cosmetology and Barbering	
NLPS Sequence	D	
Course Code	7334	
Course Description	*Barbering and Cosmetology Capstone builds and improves previously developed skills with emphasis on developing individual techniques. Professionalism, shop management, psychology in relation to barbering and cosmetology, and preparation for state board examination are stressed. Successful completion of the course requires at least 375 studio hours.*	
Prerequisite(s)/ Corequisite(s)	Principles of Barbering and Cosmetology; Barbering and Cosmetology Fundamentals; Advanced Cosmetology or Advanced Barbering	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X	
Additional Notes	This course may require extended hours of participation in order to meet the 1500 hours required for the Cosmetology and Barbering exams.	
ADDITIONAL COURSE INFO		
Funding	Less than Moderate Value	Level II
Bulletin 400	● Standard Trade & Industrial: Cosmetology K-12	
Rules 46-47	● Standard Trade & Industrial: Cosmetology 9-12 ● Occupational Specialist I, II or III: Cosmetology 9-12	
Rules 2002	● CTE: Trade & Industrial: Cosmetology ● Workplace Specialist: Cosmetology	
REPA/REPA 3	● CTE: Trade & Industrial Cosmetology 5-12 ● Workplace Specialist: Cosmetology 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment	COSM 200: Cosmetology III▼; COSM 250: Cosmetology IV▼	
Four Yr. Course Alignment		
Postsecondary Credential	A.S. in Cosmetology Management (12.0401)	
Liberal Arts/Sciences Requirements		

Promoted Certifications	Indiana State Board of Cosmetology and Barber Examiners – 1500 Cosmetology ; Indiana State Board of Cosmetology and Barber Examiners – 1500 Barbering
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Skin***
7334.D1.1	Explain the Histology of the Skin
7334.D1.2	Conduct a consultation and skin Analysis
7334.D1.3	Categorize Skin Care Products
Domain	***Makeup and Skin Procedures***
7334.D2.1	Analyze and perform proper techniques and procedures of the skin
7334.D2.2	Evaluate and perform facials and facial manipulations
7334.D2.3	Demonstrate the application of makeup and artificial eyelashes
7334.D2.4	Describe Facial Makeup and their uses
7334.D2.5	Outline the steps for Basic Makeup Application
Domain	***Hair Removal***
7334.D3.1	Demonstrate basic waxing techniques and sanitation precautions for hair removal to the eyebrows, lips, and chin
7334.D3.2	Describe Permanent Hair Removal
7334.D3.3	Discuss Temporary Hair Removal
7334.D3.4	Adhere to State and Government Regulations
Domain	***Manicuring and Pedicuring***
7334.D4.1	Evaluate nail structure and growth in fingernails and toenails
7334.D4.2	Examine disorders, diseases, and irregularities of fingernails and toenails
7334.D4.3	Demonstrate proper skills and procedures, and sanitary precautions for a manicure and pedicure
7334.D4.4	Demonstrate basic procedures for applying artificial nails including tips, wraps, acrylic nails and gels
7334.D4.5	Understand the Anatomy of the Hand and Arm and its impact on manicures
7334.D4.6	Perform Manicures and Pedicures and how to do them effectively and efficiently
7334.D4.7	Learn Advanced Nail Techniques
Domain	***Properties and Disorders of the Skin***
7334.D5.1	Describe the structure and divisions of the skin.
7334.D5.2	List the functions of the skin.
7334.D5.3	Identify recognizable skin disorders.
Domain	***Properties and Disorders of Hair and Scalp***
7334.D6.1	Identify the principal tools and implements used in the practice of barbering.
7334.D6.2	Identify the parts of the shears, clippers, and razors.

7334.D6.3	Demonstrate the correct techniques for holding combs, shears, clippers, and razors.
7334.D6.4	Demonstrate honing and stropping techniques.
7334.D6.5	Barbering Specific Standards
	Barbering Specific Standards
Domain	***Men's Facial Massage and Treatments***
7334.D7.1	Describe the benefits of facial massage and treatments.
7334.D7.2	Discuss the location and stimulation of facial muscles and nerves.
7334.D7.3	Name and demonstrate massage manipulations.
7334.D7.4	Demonstrate the use of facial treatment equipment.
7334.D7.5	Discuss products used in facial treatments.
7334.D7.6	Identify skin types and appropriate facial treatments and products.
Domain	***Equipment Care***
7334.D8.1	Identify principal and advanced tools and implements used in the practice of barbering.
7334.D8.2	Identify the parts of the shears, clippers, and razors.
7334.D8.3	Demonstrate proper methods for maintaining shears, clippers, and razors.
7334.D8.4	Demonstrate the correct techniques for holding combs, shears, clippers, and razors.
Domain	***Honing and Stropping***
7334.D9.1	Demonstrate proper methods of razor preparation sharpening and care using various types of hones strop.
7334.D9.2	Demonstrate honing and stropping techniques.
Domain	***Hair Coloring and Lightening***
7334.D10.1	Discuss color theory and its importance to hair coloring.
7334.D10.2	Identify classifications of hair color products and explain their actions on hair. Explain the action of lighteners on hair.
7334.D10.3	Identify products used in hair coloring and lightening. Demonstrate hair color and lightener application procedures.
7334.D10.4	Identify products used to color facial hair.
7334.D10.5	Discuss hair coloring and lightening safety precautions.
Domain	***Permanent Waving & Chemical Relaxing Services***
7334.D11.1	Explain the effects of chemical texture services on the hair.
7334.D11.2	Identify the similarities and differences between chemical texture services.
7334.D11.3	Discuss hair and scalp analysis for chemical texture services.
7334.D11.4	Perform a permanent wave service.
7334.D11.5	Perform a reformation curl service.
7334.D11.6	Perform a hair-relaxing service.
Domain	***Women's Haircutting and Styling***
7334.D12.1	Perform four basic women's haircuts.

7334.D12.2	Demonstrate mastery of texturizing techniques.
7334.D12.3	Perform basic wet styling techniques finger-waving.
7334.D12.4	Perform basic blow-dry styling techniques.
7334.D12.5	Identify thermal styling tools.
Domain	***Men's Haircutting and Styling***
7334.D13.1	Discuss the art and science of men's haircutting and styling.
7334.D13.2	Discuss envisioning and the client consultation.
7334.D13.3	Discuss the principles of facial shapes and anatomical features.
7334.D13.4	Identify and name the sections of the head as applied to haircutting.
7334.D13.5	Understand fundamental terms used in haircutting.
7334.D13.6	Demonstrate mastery in cutting techniques: Fingers-and-shear, shear-over-comb, freehand shear Freehand clipper cutting, clipper-over-comb Razor cutting
7334.D13.7	Demonstrate shaving the outline areas.
7334.D13.8	Demonstrate disinfection procedures.
7334.D13.9	Demonstrate basic hairstyling techniques including texturizing, finger styling, loc styling and maintenance, braiding, and blow dry styling.
7334.D13.10	Discuss safety precautions used in haircutting and styling.
Domain	***Men's Hairpieces***
7334.D14.1	Discuss reasons for purchasing hair replacements. Recognize supplies needed for servicing hair systems.
7334.D14.2	Demonstrate how to measure for a hair replacement. Explain how to create a hair replacement template.
7334.D14.3	Explain how to apply and remove hair replacement systems.
7334.D14.4	Describe how to fit and cut in a hair replacement system.
7334.D14.5	Describe how to clean and service a hair replacement.
7334.D14.6	Discuss selling hair replacement systems.
7334.D14.7	Discuss alternative hair replacement methods.
Domain	***Cosmetology IV***
7334.D15.1	Prepare for Licensure
7334.D15.2	Discuss how to prepare for written state board examinations.
7334.D15.3	Discuss barber board laws, rules, and regulations in your state. Discuss how to prepare for practical state board examinations.
7334.D15.4	Explain what information may be found in candidate information booklets or materials.
7334.D15.5	Identify the primary objectives of state barber board rules and regulations.
7334.D15.6	Understand the Salon Business and general business basics for cosmetology/barbering including business startup, structure, salaries, commission, booth rental, etc.
7334.D15.7	Understand the dynamics of the Barber Shop.
7334.D15.8	Develop professional practices and procedures in salon retailing and salon business to be

	successful in the industry.
7334.D15.9	Discuss different types of advertising.
7334.D15.10	Identify the types of records shop owners must maintain.
7334.D15.11	Demonstrate services and retail product sales techniques.
7334.D15.12	Discuss techniques on how to market yourself as a barber.
7334.D15.13	Create a business plan with short- and long-term goals to own or manage a salon
7334.D15.14	Discuss self-employment and barbershop ownership.
7334.D15.15	Understand responsibilities associated with business development and ownership.
7334.D15.16	Discuss types of business ownership.
7334.D15.17	Explain the differences of employment classifications.
7334.D15.18	Discuss the features of a business plan.
7334.D15.19	Design a floor plan.
7334.D15.20	Analyze the importance of building and maintaining professional relationships with clientele and peers
7334.D15.21	Explain the relationship between personality and attitudes and the demonstration of professional behavior.
7334.D15.22	List guidelines to maintaining personal and professional health.
7334.D15.23	Demonstrate understanding of human-relations and communication skills.
7334.D15.24	List the rules of professional ethics.
7334.D15.25	Discuss principles of personal and professional success.
7334.D15.26	Discuss the importance of continuing education.
7334.D15.27	Explain the concepts of motivation and self-management.
7334.D15.28	Create short-term and long-term goals.
7334.D15.29	Describe Personal hygiene and Public Hygiene.
7334.D15.30	Analyze selling methods including advertising and follow-up, in the salon retailing business
7334.D15.31	Be prepared to practice Indiana State Law pertaining to beauty culture.
7334.D15.32	Analyze state laws and regulations pertaining to employment in and operation of a cosmetology enterprise.
7334.D15.33	Apply employment seeking knowledge and skills to secure employment in the cosmetology industry
7334.D15.34	Discuss industry positions available for barbering students.
7334.D15.35	Explain the guidelines of goal setting.
7334.D15.36	List and discuss personal characteristics important for employment.
7334.D15.37	Discuss employment classifications and wage structures.
7334.D15.38	Write a résumé and perform a job search.
7334.D15.39	Demonstrate knowledge of Indiana Law governing the beauty culture industry
7334.D15.40	Demonstrate mastering techniques in required practical tasks
7334.D15.41	Revisit chemical texture services and haircoloring

7334.D15.42	Review safety and sanitation procedures to prepare for cosmetology license test.
7334.D15.43	Re-review state laws/requirements for earning the state cosmetology license
7334.D15.44	Demonstrate techniques for natural hair styling for ethnic/multicultural hair including chemical relaxing and permanent waving
7334.D15.45	Discuss procedures for cancer clients before, during and after treatment including the Do's and Don’ts with regards to cancer patients and survivors
7334.D15.46	Review Indiana state laws/requirements for earning the Cosmetology license
7334.D15.47	Revisit state laws for theory

Health & Human Services Dental Careers							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7315	Principles of Dental Careers	7316	Dental Careers Fundamentals	7317	Advanced Dental Careers	7318	Dental Careers Capstone

Principles of Dental Careers		
Career Cluster	Health & Human Services	
Program of Study	Dental Careers	
NLPS Sequence	A	
Course Code	7315	
Course Description	*Principles of Dental Careers will provide the foundational knowledge and skills necessary to pursue a career in the dental field. A focus will be placed on the role of the modern dental assistant and will cover key pre-clinical procedures and beginning dental terminology.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Dental Assisting	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Dental 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	DENT 171: Dental Terminology	
VU Course Alignment		

Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	DANB Chairside

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Basic Tooth Anatomy***
7315.D1.1	Students verify parts of the teeth to properly identify potential problem areas for patients.
7315.D1.2	Analyze the parts, surfaces, composition, types, function, and anatomical features of the teeth
7315.D1.3	Select location in the normal, complete permanent dentition, name all 32 teeth by dentition, arch, quadrant, class, and type
7315.D1.4	Evaluate the early development of the oral cavity and teeth
7315.D1.5	Establish the normal eruption dates for the permanent teeth.
7315.D1.6	Choose the function of the bones, muscles, sinuses, vascular and lymph supply, nerve supply and the surrounding supporting structures of the oral cavity that are of interest to the field of dentistry
7315.D1.7	Select the foramen of the nerves and arteries that supply the teeth and oral cavity
7315.D1.8	Choose five symptoms and means of treating patients with TMJ disorders
7315.D1.9	Evaluate various dental pathological conditions and anomalies development of the oral cavity and teeth
7315.D1.10	Review and identify primary and permanent tooth anatomy, morphology, and anomalies
7315.D2.1	Demonstrate use of a dental dictionary.
7315.D2.2	Properly use prefixes and suffixes with word roots/ combining forms to build medical/dental terms.
7315.D2.3	Define dental terms.
7315.D2.4	Define and use dental abbreviations, signs, and symbols accurately.
7315.D2.5	Define and correlate common diseases and conditions to appropriate procedures, treatments, and diagnostic tests.
7315.D2.6	Identify and correct misspelled dental terms.
7315.D2.7	Spell dental words correctly after hearing pronunciation.
7315.D2.8	Correctly enunciate dental terms
7315.D3.1	Students evaluate dental/laboratory materials and programs to determine a patient's needs.
7315.D3.2	Evaluate specific conditions within the oral cavity that make it such a demanding environment for the placement and long-term performance of dental materials
7315.D3.3	Analyze the programs that are in place to ensure that quality control is maintained during the manufacture of dental devices and those materials for intraoral use are safe and effective
7315.D3.4	Choose the types and uses of gypsum, impression materials, cements, resin and into metal
7315.D3.5	Connect preventive and restorative dental materials

7315.D3.6	Select the different types of liner and bases and explain the difference in intent when placing a liner rather than a base
7315.D3.7	Connect the composition, setting behavior, and uses of the various impression materials
7315.D3.8	Establish manipulation of impression materials, cements, gypsum materials, and resin materials that would be clinically useful to the dentist
7315.D3.9	Create impressions, trimmed casts, and quad-custom-made trays that are acceptable in a dentist office
7315.D3.10	Integrate the bite registrations technique on typodont using ZOE and elastomeric impression materials
7315.D3.11	Review tooth numbering systems including Universal and Palmer Systems
7315.D4.1	Students apply and adapt pre-clinical procedures to determine instruments needed to properly access patient needs
7315.D4.2	Connect the role of a modern dental assistant within the profession of dentistry
7315.D4.3	Select major historical events and changes within the profession of dentistry
7315.D4.4	Establish his or her personal conduct in accordance with the legal and ethical standards of the profession
7315.D4.5	Analyze psychological aspects of patient care in a variety of dental situations
7315.D4.6	Identify and choose instruments and equipment used in patient treatment
7315.D4.7	Apply and adapt general office maintenance and high-level sterilization and disinfection procedures
7315.D4.8	Select microorganisms and describe disease transmission and infection control guidelines
7315.D4.9	Integrate entry level clinical skills
7315.D4.10	Choose relevant terminology and acronyms as related to subject areas stressed in this course
7315.D4.11	Select the scope of the OSHA Blood borne/Hazardous Materials Standard
7315.D4.12	Verify the use of colors and numbers used for hazardous chemical identification
7315.D4.13	Verify the acquisition and use of information relative to a course objective
7315.D5.1	Students connect the importance of Diet & Nutrition in Preventative Dentistry to determine its role in patient care.
7315.D5.2	Evaluate dental plaque and cariogenic foods, and their relationship in dental disease
7315.D5.3	Analyze the use of disclosing tablets or solution, floss, brushing techniques and auxiliary dental aids
7315.D5.4	Connect personal oral hygiene and its role in patient care
7315.D5.5	Select the major factors that influence nutrition and dental health
7315.D5.6	Rate malnutrition, undernutrition, and dental health
7315.D5.7	Select dietary guidelines for each stage of life
7315.D5.8	Design and display components of the Food Guide Pyramid
7315.D5.9	Choose major functions of vitamins and minerals in human nutrition
7315.D5.10	Establish the major function of protein, fats and water, as they relate to total body wellness
7315.D5.11	Select the information gained about gingival health through periodontal examination
Domain	***Career Navigation***
7315.D6.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.

7315.D6.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7315.D6.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7315.D6.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7315.D7.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7315.D7.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7315.D7.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7315.D7.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7315.D8.1	Demonstrate computer literacy skills and basic computer functions.
7315.D8.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7315.D8.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7315.D8.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Dental Careers Fundamentals	
Career Cluster	Health & Human Services
Program of Study	Dental Careers
NLPS Sequence	B
Course Code	7316
Course Description	*Dental Careers Fundamentals will build upon the knowledge and skills in the principles course. Students will understand and practice beginning chairside functions of the dental assistant along with a focus on the anatomy and physiology of the head, neck, and oral cavity. Students will also study tooth anatomy, physiology, and morphology. This part of the program will prepare students for the Anatomy, Morphology, and Physiology exam of the NELDA certification.*
Prerequisite(s)/ Corequisite(s)	Principles of Dental Careers
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	

Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Dental Assisting	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Dental 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 101 - Medical Terminology	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	**Essential Anatomy and Physiology**
7316.D1.1	Students apply and adapt human body systems to demonstrate an understanding of patient needs.
7316.D1.2	Select body planes and cavities
7316.D1.3	Choose systems as integrated and interrelated units
7316.D1.4	Verify the structure and function of each body system
7316.D1.5	Analyze the functions of the principal organelles and label them on a diagram
7316.D1.6	Select the various types of tissue
7316.D1.7	Choose correct terminology related to anatomy and physiology
7316.D1.8	Evaluate common disorders of the human body
Domain	***Medical Terminology***
7316.D2.1	Demonstrate the use of a medical dictionary.
7316.D2.2	Define and properly use prefixes and suffixes with word roots and combining forms to build medical terms.

7316.D2.3	Define medical terms.
7316.D2.4	Choose the types and uses of gypsum, impression materials, cements, resin and into metal
7316.D2.5	Connect preventive and restorative dental materials
7316.D2.6	Select the different types of liner and bases and explain the difference in intent when placing a liner rather than a base
7316.D2.7	Connect the composition, setting behavior, and uses of the various impression materials
7316.D2.8	Establish manipulation of impression materials, cements, gypsum materials, and resin materials that would be clinically useful to the dentist
7316.D2.9	Create impressions, trimmed casts, and quad-custom-made trays that are acceptable in a dentist office
7316.D2.10	Integrate the bite registrations technique on typodont using ZOE and elastomeric impression materials
7316.D2.11	Locate and identify the organs within body systems and define their basic functions
7316.D2.12	Define and use medical abbreviations, signs, and symbols accurately.
7316.D2.13	Common diseases and conditions.
7316.D2.14	Identify selected procedures, treatments, and diagnostic tests.
7316.D2.15	Spell medical terms correctly.
7316.D2.16	Pronounce medical terms.
Domain	***Clinical Practicum***
7316.D3.1	Students integrate clinical knowledge to determine patient outcomes.
7316.D3.2	Manage operators and patients for visual and restorative procedures
7316.D3.3	Synthesize with visual and restorative procedures on clinical patients
7316.D3.4	Recommend oral physiotherapy procedures on select clinical patients
7316.D3.5	Apply and adapt instruments, disinfect equipment, and utilize barrier per OHSA guidelines
Domain	***Preclinical Practice***
7316.D4.1	Students evaluate dental techniques to determine the types of materials needed in a variety of office settings.
7316.D4.2	Choose different types of topical and local anesthetics
7316.D4.3	Verify the steps for preparing for the administration of local anesthetic
7316.D4.4	Validate the injection sites for the maxillary and mandibular arches
7316.D4.5	Verify the equipment and materials needed to administer local anesthetic
7316.D4.6	Establish supplemental techniques to administer local anesthetic
7316.D4.7	Identify the eight specialty fields recognized by the ADA
7316.D4.8	Recommend dental instruments and accessory items used in dental specialties
7316.D4.9	Manage all assigned laboratory procedures relevant to specific specialties
7316.D4.10	Recommend next steps with visual and restorative procedures on bench mannequin in preparation for clinical patients
Domain	***Dental Office Management***
7316.D5.1	Analyze patient needs and barriers to communication to include cultural and individual differences
7316.D5.2	Create a letter of application, resume, and other office correspondence used to enhance public relations with patient and professional colleagues

7316.D5.3	Connect non-verbal cues, and emphasize improving communication skills
7316.D5.4	Verify dental business office procedures and clinical records

Advanced Dental Careers		
Career Cluster	Health & Human Services	
Program of Study	Dental Careers	
NLPS Sequence	C	
Course Code	7317	
Course Description	*Advanced Dental Careers will build upon the knowledge and skills developed in the first two courses. Students will study more advanced chairside assisting functions along with advanced infection control techniques. Additionally, students will explore preventive dentistry practices and dental emergencies. This course will prepare students for the ICE exam of the NELDA certification.*	
Prerequisite(s)/ Corequisite(s)	Principles of Dental Careers; Dental Careers Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Dental Assisting	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Dental 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		

Liberal Arts/Sciences Requirements	
Promoted Certifications	NELDA ICE (infection control)
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Dental Emergencies***
7317.D1.1	Students synthesize dental emergency procedures to ensure patient safety.
7317.D1.2	Choose medical conditions (or) health changes in the dental office setting
7317.D1.3	Verify the ABCs of Emergency Care
7317.D1.4	Apply and adapt the appropriate dental emergency management procedures via scenario role-play
7317.D1.5	Verify all aspects of cardiopulmonary resuscitation and automatic external defibrillation according to the guidelines of the American Heart Association/American Red Cross for the health care provider
7317.D1.6	Choose common pharmacological agents as they relate to dental practice
7317.D1.7	Describe the parts of prescription
7317.D1.8	Confirm the use of most common emergency drugs used in dental practice
7317.D1.9	Validate controlled substance laws
7317.D1.10	Apply and adapt appropriate airway obstruction management as it pertains to specific emergency situations
Domain	***Clinical Externship***
7317.D2.1	Students synthesize appropriate chair side, clinical support, and business procedures to further develop skills in a clinical setting
7317.D2.2	Establish an understanding of the role a practicing dental assistant plays as a part of the dental health team in providing dental care to members of the community as learned in the formal academic program
7317.D2.3	Apply and adapt the ability to apply good human relations when working with the patient and the dental health program
7317.D2.4	Connect the chair-side responsibilities
7317.D2.5	Verify, expose, process, and mount dental x-rays according to the standards acceptable to the supervising dentist
7317.D2.6	Validate the ability to perform business office procedures according to prescribed standards acceptable to the instructors and the cooperating dentist
7317.D2.7	Verify selected dental laboratory procedures taught in the formal program to the satisfaction of the instructors and cooperating dentist
7317.D2.8	Recommend professional conduct, attitude, attire and grooming according to the standards of the Dental Assisting Program's instructional staff as stated in course requirements
7317.D2.9	Apply and adapt emergency procedures as taught in the formal program according to standards acceptable to the instructors and cooperating dentist
Domain	***Dental Materials***
7317.D3.1	Students analyze dental materials

7317.D3.2	Connect the relationship between components, properties and the clinical performance of amalgam, gold alloy, dental ceramics, base materials, solder, and dental implant metals
7317.D3.3	Evaluate the rationale for limiting the patients and dental personnel's exposure to mercury and cite the maximum vapor allowed by OSHA
7317.D3.4	Verify the types of silver alloy available for amalgam
7317.D3.5	Analyze the significance of gamma-2 to the clinical performance and physical properties of amalgam and cite how gamma-2 phase is controlled
7317.D3.6	Create the sequential steps for producing a finished cast restoration, starting with the wax pattern
7317.D3.7	Manage the finishing and polishing of common restorative materials and indicate precautions associated with these techniques
7317.D3.8	Connect the three different types of dental implants and compare their uses
7317.D3.9	Select restorative materials and cements
7317.D3.10	Choose full custom-made trays, mouth guard, temporary bridge, self-engaged bleaching tray and trimmed casts that are acceptable in a dental office
7317.D3.11	Apply concepts of restoration during a simulated dental procedure
Domain	
s7317.D4.1	Infection Control
7317.D4.2	Recognize infectious diseases and their relationship to patient and occupational risk
7317.D4.3	Demonstrate understanding of how to review a medical history to prevent adverse reactions during dental care
7317.D4.4	Demonstrate understanding of proper hand hygiene as performed before, during and after oral surgery and intraoral procedures
7317.D4.5	Describe how to protect the patient and operator by using personal protective equipment (PPE) (e.g., masks, gloves, eyewear, gowns)
7317.D4.6	Demonstrate understanding of how to protect the patient and operator through the reduction of aerosol, droplets, and spatter
7317.D4.7	Demonstrate understanding of how to maintain aseptic conditions to prevent cross-contamination for procedures and services
7317.D4.8	Demonstrate understanding of processing reusable dental instruments and devices
7317.D4.9	Demonstrate understanding of how to monitor and maintain processing equipment and sterilizers
7317.D4.10	Demonstrate understanding of occupational safety standards and guidelines for personnel
7317.D4.11	Demonstrate understanding of how to maintain and document programs/policies for infection control and safety

Dental Careers Capstone	
Career Cluster	Health & Human Services
Program of Study	Dental Careers
NLPS Sequence	D
Course Code	7318

Course Description	*Dental Careers Capstone will provide the opportunity for increased skill development in clinical support through work-based learning experiences. Students will also prepare for Radiation, Health, and Safety which is third and final part of the NELDA certification. The capstone course may also provide the opportunity to review and prepare for the entire NELDA certification.*	
Prerequisite(s)/ Corequisite(s)	Principles of Dental Careers; Dental Careers Fundamentals; Advanced Dental Careers	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Dental Assisting	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Dental 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications	NELDA AMP / RHS (anatomy/morphology; radiology)	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
7318.D1.1	300 hours field experience for cert requirements.	
Domain	***Purpose and Technique***	
7318.D2.1	Identify and describe purpose of basic and advanced radiographic images.	

7318.D2.2	Review and interpret patient medical and dental histories for all contraindications.
Domain	***Safety***
7318.D3.1	Identify, understand, and communicate sources of risk related to radiation including preventative techniques.
7318.D3.2	Identify, understand, and communicate procedures and practices related to safe x-radiation production, including informed consent.
Domain	***Infection Control***
7318.D3.1	Know and describe standard precautions for equipment and supplies according to ADA, CDC, and OSHA, including but not limited to breakdown and setup of treatment room; barriers; positioning devices; clinical contact surfaces; critical and semi-critical instrument sterilization; hand hygiene; PPE (donning, doffing); and cross contamination.
Domain	***Head, Neck, and Oral Cavity***
7318.D5.1	Review and understand the anatomy and pathology of hard and soft tissue.
7318.D5.2	Review and understand the circulatory and lymphatic system.
7318.D5.3	Review and understand various anatomical landmarks and how they relate to dental practice.
7318.D5.4	Review and identify the basic muscular and skeletal systems.
7318.D5.5	Review and identify the basic nervous system.
7318.D5.6	Review and identify the anatomy of the oral cavity.
7318.D5.7	Review and identify the salivary glands and sinuses.
Domain	
7318.D6.1	Connect dental office business procedures using Eagle Software computerized system.
7318.D6.2	Apply and adapt dental business office procedures and clinical records in specialty practices.
7318.D6.3	Students adapt and apply business office skills to manage a dental office.
7318.D6.4	Evaluate and describe the business office manager's duties and those business transactions carried out in the dental office.
7318.D6.5	Integrate Eagle Soft computer program to establish patient accounts and records, file insurance, claims and daily patient schedules.
7318.D6.6	Recommend the record appointments from list of patients, allowing sufficient time for each function.

Health & Human Services Emergency Medical Services							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7168	Principles of Healthcare	5274	Healthcare Fundamentals	7165	Emergency Medical Tech	7255	Healthcare Specialist Capstone

Principles of Healthcare		
Career Cluster	Health & Human Services	
Program of Study	Central Service Technician, Certified Clinical Medical Assistant, Emergency Medical Services, Pharmacy, Pre-Nursing/Healthcare Specialist: Certified Nursing Aide (CNA)	
NLPS Sequence	A	
Course Code	7168	
Course Description	*Principles of Healthcare content examines skills common to specific health career topics such as patient nursing care, dental care, animal care, medical laboratory, public health, and an introduction to healthcare systems. Lab experiences are organized and planned around the activities associated with the student's career objectives.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	●CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 100: Intro to Healthcare, HLHS 104: CPR- Basic Life Support	

VU Course Alignment	HSGN 102: Introduction to Health Careers
Four Yr. Course Alignment	USI - HP 211: The Healthcare Delivery System, KIN 192: Concepts in Wellness and Fitness IUB - SPH B150: Introduction to Public Health
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711) VU - C.G. Health Care Professional - Pre-Nursing CNA Track (51.3801) B.S. in Community and Public Health (51.0701)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Healthcare Systems***
7168.D1.1	Describe how health care is developed, delivered, and organized.
7168.D1.2	Discuss health care delivery systems and trends.
7168.D1.3	Identify ethical and legal issues in health care.
7168.D1.4	Apply basic medical terminology principles.
7168.D1.5	Identify the basic organization of the human body, the body systems, and the stages of growth and development.
7168.D1.6	Analyze behaviors for success in the health care field, including lifestyles management, professionalism, and lifelong learning.
7168.D1.7	Describe personal and workplace safety measures including body mechanics, infection control, and environmental safety.
7168.D1.8	Discuss principles of communication in a health care setting including treating the patient with respect as an individual, accommodation of cultural diversity, identifying and providing for patient needs.
7168.D1.9	Identify the purposes and procedures for medical documentation.
7168.D1.10	Compare various health care occupations, including education requirements, credentialing or licensing, scope of practice, and workforce data.
Domain	***CPR / Basic Life Support***
7168.D2.1	Recognize cardiac vascular emergencies and/or respiratory arrest and take appropriate action.
7168.D2.2	Establish an airway and initiate ventilation.
7168.D2.3	Manage obstructed airway in adult, child, and infant.
7168.D2.4	Perform one and two-person adult, child and infant CPR using universal precautions.
7168.D2.5	Demonstrate the use of an Automated External Defibrillator (AED)
Domain	***Wellness Knowledge***
7168.D3.1	Define fitness/wellness and the major areas it encompasses.
7168.D3.2	Assess individuals' level of fitness (including blood pressure, resting heart rate, flexibility, muscle strength and endurance, body composition, and aerobic capacity).
7168.D3.3	Learn safe and effective exercise routines with proper technique.
7168.D3.4	Design a personal health and fitness plan and a healthy eating plan to incorporate into a

	healthy lifestyle.
7168.D3.5	Develop a behavior modification plan that would encourage individuals to exercise.
7168.D3.6	Discuss the wellness wheel and interrelatedness of stress, nutrition, exercise, and weight management for a healthy quality of life.
7168.D3.7	Discuss lifestyle choices and their effect on fitness and wellness with regard to disease, disease prevention, and substance abuse (holistic, prescription, and illegal drugs).
7168.D3.8	Provide guidelines for prescribing lifestyle changes to improve levels of wellness/fitness.
Domain	***Career Navigation***
7168.D4.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7168.D4.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7168.D4.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7168.D4.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7168.D5.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7168.D5.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7168.D5.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7168.D5.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7168.D6.1	Demonstrate computer literacy skills and basic computer functions.
7168.D6.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7168.D6.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7168.D6.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Healtchare Fundamentals	
Career Cluster	Health & Human Services
Program of Study	Central Service Technician, Certified Clinical Medical Assistant, Emergency Medical Services, Pharmacy, Pre-Nursing/Healthcare Specialist: Certified Nursing Aide (CNA)
NLPS Sequence	B
Course Code	5274
Course	*Healthcare Fundamentals prepares students with language skills necessary for effective,*

Description	*independent use of health and medical reference materials. It includes the study of health and medical abbreviations, symbols, and Greek and Latin word part meanings, all taught within the context of body systems. This course builds skills in pronouncing, spelling, and defining new words encountered in verbal and written information in the healthcare industry. Additionally, the course introduces cells, tissues, and human anatomy highlighting essential physiological principles through a systemic approach. Students have the opportunity to acquire essential skills for accurate and logical communication, and interpretation of medical records.*	
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare or Principles of Pharmacy Tech	
Credits	2 semester course, 2 semesters required, 1 credit per semester, maximum of 2 credits	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Workplace Specialist: Dental Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12 ● Workplace Specialist: Dental Careers 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 101: Medical Terminology, HLHS 102: Essential Anatomy and Physiology	
VU Course Alignment	HIMT 110: Medical Terminology for Allied Health VU-EC – BIOL 107/L (Lab): Essentials of Human Anatomy and Physiology	
Four Yr. Course Alignment	BSU - NUR 101: Terminology for Health Care Professionals USI - HP 115: Medical Terminology for Health Professionals	
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711) VU - A.S. in Nursing (51.3801), C.G. Health Care Professional - Pre-Nursing CNA Track (51.3801) VU-EC - A.S. in Nursing (51.3801) USI – B.S. in Nursing (51.3801) BSU – B.S. in Respiratory Therapy	
Liberal Arts/Sciences		

Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Medical Terminology***
5274.D1.1	Demonstrate the use of a medical dictionary.
5274.D1.2	Define and properly use prefixes and suffixes with word roots and combining forms to build medical terms.
5274.D1.3	Define medical terms.
5274.D1.4	Locate and identify the organs within body systems and define their basic functions.
5274.D1.5	Define and use medical abbreviations, signs, and symbols accurately.
5274.D1.6	Define common diseases and conditions.
5274.D1.7	Identify selected procedures, treatments, and diagnostic tests.
5274.D1.8	Spell medical terms correctly.
5274.D1.9	Pronounce medical terms.
Domain	***Essential Anatomy and Physiology***
5274.D2.1	Apply basic knowledge of chemistry as pertinent to the human body.
5274.D2.2	Identify the major body systems and the organs which comprise each of them.
5274.D2.3	Summarize and define the basic structure and function of each of the body systems.
5274.D2.4	Demonstrate the ability to utilize a microscope to examine prepared slides and apply to physiological conditions and body systems.
5274.D2.5	Adapt the structural and functional aspects of cell organization to the body systems.
5274.D2.6	Classify the types and composition of the 4 basic types of body tissues.
5274.D2.7	Discuss and identify disease states in relation to body systems.

Emergency Medical Tech	
Career Cluster	Health & Human Services
Program of Study	Emergency Medical Services
NLPS Sequence	C
Course Code	7165
Course Description	*The Emergency Medical Technician (EMT) course is based on the training program developed by the Department of Transportation and the Emergency Medical Services Commission of Indiana. It covers theories, techniques, and operational aspects of pre-hospital emergency care within the scope and responsibility of the emergency medical technician (EMT). It requires laboratory practice and clinical observation in a hospital emergency room and ambulance. Successful completion of the course meets national requirements to test for certification as an NREMT.*
Prerequisite(s)/	Principles of Healthcare; Healthcare Fundamentals

Corequisite(s)		
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/ CTE)	
Additional Notes	Schools are strongly encouraged to offer the EMT course along with Principles of Healthcare and Medical Terminology (Healthcare Fundamentals) as part of a 3 period block of time.	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation: First Responder 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Emergency Medical Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	PARM 102: Emergency Medical Tech	
VU Course Alignment	EMTB 212: Emergency Medical Technician	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Emergency Medical Technician (51.0810) VU – CPC Pre-Health Care Professional (51.0899)	
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 112: Student Success in Healthcare	
Promoted Certifications	Emergency Medical Responder, Emergency Medical Technician (EMT)	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Emergency Medical Care***	
7165.D1.1	Define key terms.	
7165.D1.2	Give an overview of the historical events leading to the development of modern emergency medical services (EMS).	
7165.D1.3	Describe the importance of each of the National Highway Traffic Safety Administration standards for assessing EMS systems.	
7165.D1.4	Describe the components of EMS system that must be in place for a patient to receive emergency medical care.	

7165.D1.5	Compare and contrast the training and responsibilities of EMRs, EMTs, AEMTs and Paramedics.
7165.D1.6	Explain each of the specific areas of responsibility for the EMT.
7165.D1.7	Give examples of the physical and personality traits that are desirable for EMTs.
7165.D1.8	Describe various job settings that may be available to EMTs.
7165.D1.9	Describe the purpose of the National Registry of Emergency Medical Technicians.
7165.D1.10	Explain the purpose of quality improvement programs in EMS programs.
7165.D1.11	Explain the role in the quality improvement process.
7165.D1.12	Explain medical direction as it relates to EMS systems.
7165.D1.13	List ways in which research may influence EMT practice.
7165.D1.14	Give examples of how EMS providers can play a role in public health.
7165.D1.15	Given scenarios, decide how an EMT may demonstrate professional behavior.
Domain	***Preparation for EMT***
7165.D2.1	Connect Emergency Medical Services (EMS) and know the roles, responsibilities, and characteristics of the EMT-Basic
7165.D2.2	Connect the reactions EMT-Basic and family may experience when facing trauma, illness and death and ways to recognize and protect oneself
7165.D2.3	Analyze the EMT scope of practice in dealing with DNR (do not resuscitate), expressed and implied consent, duty to act, confidentiality, and other related issues
7165.D2.4	Verify topographic terms such as medial, lateral, proximal, distal, superior, inferior, anterior, posterior, midline, right and left, mid-clavicular, bilateral, mid-axillary and know anatomy and function of the following major body systems: respiratory, circulatory, musculoskeletal, nervous, and endocrine
7165.D2.5	Verify the components of vital signs such as breathing, pulse rate, skin color, temperature, pupils, blood pressure and other vital signs
7165.D2.6	Evaluate the guidelines and safety precautions that need to be followed when lifting a patient and various patient carrying devices
7165.D2.7	Evaluate the components of vital signs such as breathing, pulse rate, skin color, temperature, pupils, blood pressure and other vital signs
Domain	***Respiratory System***
7165.D3.1	Establish the major structures of the respiratory system, signs of adequate and inadequate breathing, and multiple methods and techniques of improving breathing and ventilation
7165.D3.2	Select the following techniques including head-tilt chin lift, jaw thrust, suctioning, using a pocket mask and the bag-valve mask system, and a flow restricted, oxygen-powered ventilation device
7165.D3.3	Recommend the steps in performing the actions taken when providing mouth-to-mouth and mouth-to-stoma artificial ventilation
7165.D3.4	Verify how to measure and insert an oropharyngeal (oral) and nasopharyngeal (nasal) airway and the components of an oxygen delivery system
7165.D3.5	Choose a nonrebreather facemask and state the oxygen flow requirements needed for its use

	and indications for using a nasal cannula versus a nonrebreather facemask
7165.D3.6	Establish the rationale for basic life support artificial ventilation and airway protective skills taking priority over most other basic life support skills
Domain	***Patient Assessment***
7165.D4.1	Evaluate common hazards found at the scene of a trauma and a medical patient and how to evaluate the scene for safety and potential hazards
7165.D4.2	Integrate how to perform an initial assessment of an adult, child, or infant patient
7165.D4.3	Verify the methods and rationale of conducting a rapid trauma assessment and a focused history and physical exam
7165.D4.4	Diagnose individuals with specific chief complaints with known and not known prior history, unresponsive patients, and patients with an altered mental status
7165.D4.5	Verify the areas of the body that are evaluated during a detailed physical exam of both a trauma and medical patient
7165.D4.6	Establish the reasons and demonstrate the skills for repeating the initial assessment as part of the on-going assessment
7165.D4.7	Verify various methods of communicating with a patient and about a patient's condition including radio communications and patient reports on the scene or at a facility
7165.D4.8	Verify the components and related issues of the written patient report including a prehospital care report, patient refusal, legal implications, EMS gathering systems and proper use of medical terminology
Domain	***General Pharmacology***
7165.D5.1	Evaluate the medications with which the EMT-Basic may assist the patient with administering and know the generic names, medication forms and rationale for administering
7165.D5.2	Verify the structure and function of the respiratory system including signs, symptoms, and emergency care of patients with breathing difficulties
7165.D5.3	Verify the structure and function of the cardiovascular system including signs, symptoms, and emergency care of patients with various cardiac emergencies
7165.D5.4	Analyze and know the steps in the emergency medical care of the patient taking diabetic medicine with an altered mental status and a history of diabetes
7165.D5.5	Evaluate and know the emergency medical care of the patient with an allergic reaction
7165.D5.6	Analyze patients and know emergency medical care for the patient with possible overdose
7165.D5.7	Verify how to identify, assess, and provide emergency medical care to a patient experiencing an environmental emergency
7165.D5.8	Verify how to identify, assess, and provide emergency medical care to a patient with psychological, behavioral, and/or suicidal emergencies
7165.D5.9	Connect obstetrics and gynecology structures and techniques for providing emergency medical care in cases of delivery and birth
Domain	***EMT Basic / Trauma***
7165.D6.1	Connect the structure and function of the circulatory system and steps in the emergency medical care and transportation of the patient with shock and signs and symptoms of internal

	and/or external bleeding
7165.D6.2	Evaluate the major functions of the skin and the emergency medical care of a patient with open and closed soft tissue injuries, chest and abdomen injuries, amputations, and various burns
7165.D6.3	Analyze the functions of the muscular and skeletal systems and the emergency care of patients requiring splinting those with painful, swollen deformed extremities
7165.D6.4	Evaluate the functions of the nervous system and the emergency care and transportation of patients with spinal injuries
Domain	***Infants and Children***
7165.D7.1	Establish the developmental considerations of infants, toddlers, pre-school, school age and adolescent children
7165.D7.2	Verify the cognitive, affective, and psychomotor issues of emergency care of patients who are infants or children
Domain	***Ambulance Operations***
7165.D8.1	Apply and adapt the medical and non-medical equipment needed to respond to a call, laws related to ambulance operation, safety considerations, transportation of patients, cleaning, disinfection and sterilization, and the patient information report
7165.D8.2	Connect the fundamental components of extrication and patient access
7165.D8.3	Verify responsibilities and procedures, including triage, when responding to calls involving hazardous materials or conditions, multiple-causality situations, and disasters
Domain	***Hazardous Materials***
7165.D9.1	Connect and meet the competencies for First Responder Awareness and Operations Levels as set forth by OSHA 1910.120 and NFPA 472
7165.D9.2	Manage a hazardous materials incident to determine the magnitude of the problem
7165.D9.3	Establish how to plan an initial response within the capabilities and competencies of available personnel, personal protective equipment, and control equipment
7165.D9.4	Verify how to implement the planned response to favorably change the outcomes consistent with the local emergency response plan and the organization's standard operating procedures
7165.D9.5	Verify how to evaluate the progress of the actions taken to ensure that the response objectives are being met safely, effectively, and efficiently
Domain	***Response to Terrorism***
7165.D10.1	Select domestic and international terrorism per the current Department of Justice definition
7165.D10.2	Evaluate, through case histories, various types of potential incidents
7165.D10.3	Choose differences and similarities between responding to terrorist and non-terrorist incidents
7165.D10.4	Confirm suspicious circumstances which may indicate possible terrorism
7165.D10.5	Select the appropriate use of shielding at B-NICE incidents
7165.D10.6	Choose the use of time and distance as protective measures at B-NICE incidents
7165.D10.7	Choose the basic steps of emergency decontamination and routine post-exposure decontamination

7165.D10.8	Establish unique challenges that may confront responders when attempting to implement scene control
7165.D10.9	Connect what hazard and risk components influence public protection considerations
7165.D10.10	Recommend what resources should be utilized to maintain perimeter security at a terrorist incident
7165.D10.11	Verify outward warning signs of B-NICE incidents
7165.D10.12	Establish and explain tactical considerations associated with acts of terrorism involving biological, nuclear, incendiary, chemical, and explosive materials
7165.D10.13	Select and list specialized equipment needed to support tactical operations involving BNICE incidents
7165.D10.14	Given a case study, integrate tactical considerations for each incident category
7165.D10.15	Verify the authorities and responsibilities in Presidential Decision Directive 39
7165.D10.16	Analyze crime scene issues which must be addressed when managing an incident involving potential criminal activities
7165.D10.17	Select applicable resources referenced in the Federal Response Plan (FRP) and the FRP Terrorism Annex
7165.D10.18	Choose the preliminary indicators for transition from emergency phase to recovery and termination
7165.D10.19	Recommend unique debriefing and security issues

Healthcare Specialist Capstone	
Career Cluster	Health & Human Services
Program of Study	Pre-Nursing/Healthcare Specialist: Certified Nursing Aide (CNA), Emergency Medical Services, Certified Clinical Medical Assistant
NLPS Sequence	D
Course Code	7255
Course Description	*The Healthcare Specialist Capstone course will facilitate healthcare students' acquisition of additional knowledge and skills necessary to work in a variety of healthcare settings beyond a long term care facility including hospitals, doctors' offices, and clinics. Students can accomplish this goal by completing coursework that will cover topics such as Medical Law and Ethics, Electronic Health Records, and/or Behavioral Health. Schools may offer additional healthcare certifications such as the Certified Clinical Medical Assistant (CCMA) or Phlebotomy along with the coursework or in place of the coursework.*
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare; Healthcare Fundamentals; Healthcare Specialist: CNA, EMT or Certified Clinical Medical Assistant (CCMA)
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max
Counts Toward	Counts as a directed elective or elective for all diplomas

Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation: First Responder 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Emergency Medical Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 105:Medical Law and Ethics, HLHS 122: Electronic Health Records, HLHS 125: Behavioral Health	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	Certified Medical Assistant (CMA)	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Medical Law and Ethics***
7255.D1.1	Explain how professional standards, laws, and ethics guide behavior for health care professionals in medical practices, hospitals, long term care facilities, clinics, and in emergency service settings.
7255.D1.2	Compare and contrast concepts related to ethics, bioethics, and law.
7255.D1.3	Discuss the United States legal system and processes as they relate to medical practice.
7255.D1.4	Describe the current health care environment including types of practices, licensing, and certification of health care professionals.
7255.D1.5	Defend the right of physicians and their patients as protected by federal and state laws.
7255.D1.6	Detail federal and state statutes pertinent to health care professionals in the areas of hiring and employment, safety, patient privacy and confidentiality, consumer protection, and public records/reporting.
7255.D1.7	Outline the public duties expected of physicians in the areas of reporting, legal records,

	management of controlled substances, and the Good Samaritan laws.
7255.D1.8	Outline appropriate risk management procedures regarding minimizing litigation and practicing within legal boundaries.
Domain	***Electronic Health Records***
7255.D2.1	Acquire, store, and retrieve patient information from the EHR database.
7255.D2.2	Execute, manage EHR database and maintain software and hardware including updates and file maintenance (e.g., purging, archiving).
7255.D2.3	Operate integrated devices with EHR software (e.g., scanners, fax machine, signature pads, and cameras) to transmit patient data for external use (e.g., insurance, pharmacies, and other providers).
7255.D2.4	Access clinical vocabularies in a health information system when appropriate and comply with patient safety standards regarding abbreviations in the health information system.
7255.D2.5	Generate Insurance verifications, patient statements, encounter forms/super bills, and face/admission sheets.
7255.D2.6	Retrieve diagnosis and procedural descriptions from medical records, enter codes and billing information into the EHR, and post payments to patient accounts at the time of visit.
7255.D2.7	Understand how to find codes in the ICD, CPT and HCPCS manuals.
7255.D2.8	Review charts to ensure compliance of proper charting, report to the proper enforcement office, and document the link between effective charting and reimbursement for procedures performed by clinicians.
7255.D2.9	Adhere to professional standards of care, including HIPAA Privacy & Security Rules and facility policy, as they pertain to medical records.
7255.D2.10	Generate reports for clinical and financial resources (e.g., aging report and financial analysis).
7255.D2.11	Compile and maintain medical care and census data for continuity of care records (e.g., reports on diseases treated, surgery performed, and use of hospital beds for clinical audits).
7255.D2.12	Provide ongoing end-user training and technical support of EHR software.
7255.D2.13	Execute EHR workflow, patient flow within the office (e.g., scheduling, patient registration and verification, patient referrals.
7255.D2.14	Use proper privileges and develop clinical templates from existing searchable databases.
Domain	***Behavioral Health***
7255.D3.1	Identify theories and demonstrate fundamental knowledge of biological, sociological, cultural, psychological, and spiritual development across the adult lifespan.
7255.D3.2	Define and discuss the impact of culture, diversity, and social justice as they pertain to perception and treatment of behavioral health concerns and aging.
7255.D3.3	Examine lifestyle behaviors associated with the development of chronic behavioral health illnesses.
7255.D3.4	Discuss and identify treatment options, pharmacological and non-pharmacological interventions of psychological and behavioral disorders for the following: Anxiety, Stress Disorders, Disorders of Mood, Eating Disorders, Substance Use and Addictive Disorders, Disorders of Aging and Cognition, exhibiting expression or indications of distress (i.e., anxiety, striking out, self-isolating, etc.)
7255.D3.5	Identify types and classes of drugs related to the treatment of selected behaviors and abnormal behaviors, including potential complications from drug interactions.
7255.D3.6	Discuss and define parameters of therapeutic touch and communication.
7255.D3.7	Demonstrate general and specific verbal interventions used to support patient treatment and

	recovery.
7255.D3.8	Demonstrate understanding of caregiver behaviors which support low conflict interactions with patients.
7255.D3.9	Identify strategies for behavioral health promotion and interprofessional collaborative practice when interacting with patients with behavioral health issues.
7255.D3.10	Describe and discuss the dying process, the definition of death, and the stages of grief as they apply to caregivers.
Domain	***Healthcare Specialist Certifications***
7255.D4.1	Certified Nursing Assistant (CNA)
7255.D4.2	Emergency Medical Technician (EMT)
7255.D4.3	Certified Clinical Medical Assistant (CCMA)
7255.D4.4	Phlebotomy (dual enrollment only)
7255.D4.5	Electrocardiography (dual enrollment only)

Health & Human Services Exercise Science/Physical Therapy							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7320	Principles of Exercise Science	7321	Kinesiology	7322	Human Performance	7323	Physical Therapy
						7324	Fitness Management Capstone

Principles of Exercise Science		
Career Cluster	Health & Human Services	
Program of Study	Exercise Science/Physical Therapy	
NLPS Sequence	A	
Course Code	7320	
Course Description	*Principles of Exercise Science provides an introduction to the science of exercise and human movement. Special topics include exercise physiology, sport biomechanics, sports medicine, and motor integration. Additionally, the course will examine career options in sport, health and wellness, education, and the medical fields such as personal training, athletic training, and physical therapy.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Workplace Specialist: Physical Therapy	
REPA/REPA 3	● CTE: Health Occupations: Athletic Training 5-12 ● Workplace Specialist: Health Science – Athletic Training 9-12	

	● Workplace Specialist: Physical Therapy 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HLHS 111: Health and Wellness for Life*
VU Course Alignment	PFWL 100: Lifetime Fitness/Wellness, HLTH 201: Personal Health Science
Four Yr. Course Alignment	USI – KIN 281: Personal Health Science; KIN 282: CPR for the Healthcare Provider and Sports Injury Prevention
Postsecondary Credential	USI - B.A./B.S. in Kinesiology (31.0505)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Exercise Science***
7320.D1.1	Describe the development of exercise science as a field of study from an historical perspective.
7320.D1.2	Describe the scientific method and its use in research in exercise science.
7320.D1.3	Recognize the role of sport from a societal perspective.
7320.D1.4	Identify and discuss the role of exercise science in sport and medical professions.
7320.D1.5	Examine career options in sport, health and wellness, education, and the medical fields for those who study exercise science.
7320.D1.6	Identify disciplines related to exercise science and examine each: A. Exercise physiology, B. Fitness, C. Sports medicine/athletic training/physical therapy, D. Nutrition, E. Biomechanics, F. Motor learning and motor control, G. Coaching, H. Sport psychology, I. Sport sociology
7320.D1.7	Examine and discuss current research topics in exercise science.
Domain	***Health and Wellness for Life***
7320.D2.1	Identify and describe the basic components of wellness.
7320.D2.2	Identify and describe personal health assessment techniques.
7320.D2.3	Explain strategies for achieving wellness.
7320.D2.4	Identify and describe hereditary factors relating to wellness.
7320.D2.5	Identify and describe psychological factors relating to wellness.
7320.D2.6	Identify and explain biological factors as they relate to wellness.
7320.D2.7	Compare the components of wellness as they change in various stages of the life cycle.
7320.D2.8	Identify and describe a variety of health conditions and diseases.
7320.D2.9	Describe the relationship between lifestyle choices and a variety of health conditions and diseases.
7320.D2.10	Explain ways in which factors within society and diverse cultures may affect personal health.
Domain	***CPR/Basic Life Support***

7320.D3.1	Recognize cardiac vascular emergencies and/or respiratory arrest and take appropriate action.
7320.D3.2	Establish an airway and initiate ventilation.
7320.D3.3	Manage obstructed airway in adult, child, and infant.
7320.D3.4	Perform one and two-person adult, child, and infant CPR using universal precautions.
7320.D3.5	Demonstrate the use of and Automated External Defibrillator (AED)
Domain	***Career Navigation***
7320.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7320.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7320.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7320.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7320.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7320.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7320.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7320.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7320.D5.1	Demonstrate computer literacy skills and basic computer functions.
7320.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7320.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7320.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Kinesiology	
Career Cluster	Health & Human Services
Program of Study	Exercise Science/Physical Therapy
NLPS Sequence	B
Course Code	7321
Course Description	*Kinesiology students will study fundamental concepts concerning the interaction of biological and mechanical aspects of the musculoskeletal and neuromuscular structures. An emphasis on practical applications of the concepts will be accomplished through an introduction to*

	fitness training methods and modalities for developing specific conditioning effects in individuals. Laboratory sessions focus on anatomy and physiology of the musculoskeletal and cardiovascular systems, theories on fitness programming, and injury avoidance in fitness environments.
Prerequisite(s)/ Corequisite(s)	Principles of Exercise Science Recommended: Anatomy and Physiology
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a Directed Elective or Elective for all diplomas Fulfills a science requirement for all diploma types
Dual Credit Status	X
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Workplace Specialist: Physical Therapy	
REPA/REPA 3	● CTE: Health Occupations: Athletic Training 5-12 ● Workplace Specialist: Health Science – Athletic Training 9-12 ● Workplace Specialist: Physical Therapy 9-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HLHS 102: Essential Anatomy & Physiology*; CPTR 205: Fundamental Kinesiology*
VU Course Alignment	PHED 150: Intro to Kinesiology & Sport
Four Yr. Course Alignment	USI KIN 188: Introduction to Kinesiology & Sport
Postsecondary Credential	USI - B.A./B.S. in Exercise Science (31.0505)
Liberal Arts/Sciences Requirements	ENGL 111: English Composition, COMM 101: Fundamentals of Public Speaking or COMM 102: Introduction to Interpersonal Communication, IVYT 112: Student Success – Healthy Sciences and Nursing
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Fundamental Kinesiology***

7321.D1.1	Utilize appropriate anatomical terminology to describe the musculoskeletal structures of the body.
7321.D1.2	Discuss the role of kinesiology in physical activity, exercise, and activities of daily living.
7321.D1.3	Analyze human movement of the upper and lower extremities found commonly in physical activity, exercise, and activities of daily living.
7321.D1.4	Identify the muscles involved in common methods of physical activity, exercise, and activities of daily living.
7321.D1.5	Describe the origins, insertions, and actions for skeletal muscles involved in movements of the: A. Shoulder girdle, B. Shoulder joint, C. Elbow joint, D. Wrist and hand, E. Head and neck, F. Trunk/abdomen, G. Pelvic girdle, H. Hip joint, I. Knee joint, J. Ankle and foot.
7321.D1.6	State the general structural design and functions of each type of joint of the body.
7321.D1.7	Identify the movements possible at each joint.
7321.D1.8	Understand how joint structure and postural alignment impacts range of motion and movement.
7321.D1.9	Distinguish the difference between the several types of connective tissues.
7321.D1.10	Understand the function of connective tissue throughout different movements.
7321.D1.11	Explain common problems found at each joint related to physical activity, exercise, activities of daily living, and overuse injuries.
Domain	***Essential Anatomy and Physiology***
7321.D2.1	Apply basic knowledge of chemistry as pertinent to the human body.
7321.D2.2	Identify the major body systems and the organs which comprise each of them.
7321.D2.3	Summarize and define the basic structure and function of each of the body systems.
7321.D2.4	Demonstrate the ability to utilize a microscope to examine prepared slides and apply to physiological conditions and body systems.
7321.D2.5	Adapt the structural and functional aspects of cell organization to the body systems.
7321.D2.6	Classify the types and composition of the 4 basic types of body tissues.
7321.D2.7	Discuss and identify disease states in relation to body systems.

Human Performance	
Career Cluster	Health & Human Services
Program of Study	Exercise Science/Physical Therapy
NLPS Sequence	C
Course Code	7322
Course Description	*Students in Human Performance will learn basic human physiology relating to exercise and how the body adapts to acute and chronic physical activity. Systems covered include cellular metabolic processes, energy systems, and the effects of exercise on the respiratory, nervous, cardiovascular, endocrine, skeletal, and muscular systems. The course will also study the basic nutritional principles needed for optimal athletic and human performance.*
Prerequisite(s)/	Principles of Exercise Science

Corequisite(s)	Recommended: Kinesiology	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Workplace Specialist: Physical Therapy	
REPA/REPA 3	● CTE: Health Occupations: Athletic Training 5-12 ● Workplace Specialist: Health Science – Athletic Training 9-12 ● Workplace Specialist: Physical Therapy 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	CPTR 206: Modern Concepts in Exercise & Fitness*; CPTR 212: Foundations in Exercise Science*	
VU Course Alignment	PHED 212: Intro to Exercise Science	
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements	ENGL 111: English Composition, COMM 101: Fundamentals of Public Speaking or COMM 102: Introduction to Interpersonal Communication, IVYT 112: Student Success – Healthy Sciences and Nursing	
Promoted Certifications	NASM Cert Personal Trainer ACSM Certified Personal Trainer, Certificate	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Modern Concepts in Exercise & Fitness***
7322.D1.1	Identify the difference between physical activity and exercise programming.
7322.D1.2	Define behavioral theories that may affect the implementation of exercise programming.
7322.D1.3	Implement goal setting techniques that are used to enhance/modify exercise programming through objectivity.
7322.D1.4	Identify the components of physical fitness.
7322.D1.5	Summarize the benefits of each component of physical fitness in maintaining good health.

7322.D1.6	Demonstrate basic techniques used to assess physical fitness components.
7322.D1.7	Apply the basic principles of training that govern exercise prescription, such as frequency, intensity, duration, and type.
7322.D1.8	Explain how periodization, progression, overload, volume, and recovery are manipulated within various training programs.
7322.D1.9	Demonstrate knowledge through projects which apply concepts and skills learned in laboratory sessions for self and others.
7322.D1.10	Develop a comprehensive, safe, and effective exercise program for oneself and others based on needs, goals, and assessments obtained in class and lab experiences.
Domain	***Foundations in Exercise Science***
7322.D2.2	Recognize the role of sport, health, fitness, and wellness from a societal perspective.
7322.D2.3	Evaluate the role of exercise science in sport, health, fitness, wellness, and medical professions.
7322.D2.4	Examine career options in sport, health and wellness, fitness, education, and the medical fields.
7322.D2.5	Identify disciplines related to exercise science and examine each: (A) Exercise physiology, (B) Fitness, (C) Biomechanics, (D) Coaching, (E) Sport Psychology & Sociology
7322.D2.6	Research current topics in exercise science and lifestyle modification.
7322.D2.7	Differentiate between physical and psychological needs pertaining to fitness throughout a population such as motivation, metabolic needs, physical limitations, self-efficacy, current fitness level, and health status.
7322.D2.8	Distinguish the difference between health, wellness, and fitness.
7322.D2.2	Recognize the role of sport, health, fitness, and wellness from a societal perspective.

Physical Therapy Capstone	
Career Cluster	Health & Human Services
Program of Study	Exercise Science/Physical Therapy
NLPS Sequence	D
Course Code	7323
Course Description	*The Physical Therapy Capstone course is designed to provide students the opportunity to explore the role of a physical therapy assistant and to practice technical skills previously learned in the classroom. It prepares students with the knowledge, skills, and attitudes essential for providing basic care in extended care facilities, hospitals, and home health agencies under the direction of licensed physical therapists. In addition, students will learn skills specific to physical therapy including observing patients' progress, helping patients do specific exercises, using massage and stretching for treatment, aiding patients with devises for movement, educating patients and families, and basic assisting in cleaning treatment areas and clerical work.*
Prerequisite(s)/ Corequisite(s)	Principles of Exercise Science; Kinesiology; Human Performance; or Any Healthcare Specialist

	CTE Concentrator Sequence (EMT, CNA, CCMA)	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas Fulfills a science requirement for all diploma types	
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Physical Therapy 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	PTAS 101: Introduction to the Physical Therapist Assistant*	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	AS Physical Therapy Assistant	
Liberal Arts/Sciences Requirements	ITCC - APHY 101: Anatomy and Physiology I, APHY 102: Anatomy and Physiology II, ENGL 111: English Composition	
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain		
7323.D1.1	Student must possess basic knowledge of healthcare system and administration	
7323.D1.2	Understand the variety of insurances and healthcare plans patients will use to receive services	
7323.D1.3	Control the quality of care for patients including the regulations dictated by state federal: A. HIPPAA, B. Health Insurance and Portability Accountability Act, C. Informed consent, D. Americans with Disabilities, E. Statutory Laws	
7323.D1.4	Review ethical Issues, malpractice, and sexual harassment laws	
Domain		

7323.D2.1	Student must demonstrate basic knowledge and proficiency working with the musculoskeletal system
7323.D2.2	Know the components of the musculoskeletal system including but not limited to: Bones, Fascia, Tendon, Ligament, Muscle, Cartilage, Joint, and Joint Receptors
7323.D2.3	Identify specific joints and their component parts as well as the range of motion provided including the shoulder, elbow, wrist/hand, hip, knee, ankle/foot, craniovertebral, cervical, temporomandibular, thoracic, lumbar, sacroiliac
7323.D2.4	Study the kinesiology of the musculoskeletal system including directional terms, movements and body segments, levers, osteo-kinematics, degrees of freedom, arthrokinematics, close packed and open packed joint positions, capsular and non-capsular patterns of restriction
7323.D2.5	Review musculoskeletal injury and repair involving muscles, tendons, ligaments, tissue healing, articular cartilage injury and disease
7323.D2.6	Collect Data on the musculoskeletal system such as range of motion, end feels, leg length, manual muscle testing, deep tendon reflexes, upper/lower quarter screens, posture analysis, palpation, girth measurement, joint mobility, special tests
7323.D2.7	Identify the following musculoskeletal pathologies: fractures, bursitis, degenerative joint disease, rheumatoid arthritis, Lupus, ankylosing spondylitis, psoriatic arthritis, gout, fibromyalgia, tendonitis, ruptured Achilles, acromioclavicular injuries, adhesive capsulitis, sprains, ligament tears, bicipital tendonitis, carpel tunnel, De Quervain tenosynovitis, epicondylitis, finger injuries, groin pain, hallux valgus, herniated nucleus pulposus, iliotibial band friction syndrome, MCL sprain, meniscal injuries, osteoarthritis, patellofemoral dysfunction, plantar fasciitis, rotator cuff, scaphoid fracture, spinal stenosis, spondylolysis, thoracic outlet syndrome, wrist fractures
7323.D2.8	Recognize common orthopedic surgical repairs like spinal surgery and total joint replacement
7323.D2.9	Student must demonstrate basic knowledge and proficiency working with the neuromuscular system
7323.D2.10	Know the basic anatomy, physiology, organization of the nervous system, central nervous system, peripheral nervous system, and nerves of the somatic nervous system
7323.D2.11	Identify reflexes including monosynaptic, superficial, pathologic, patterned behavioral, supraspinal, protective, etc.
7323.D2.12	Distinguish proprioception, balance, and kinesthesia and understand how the body performs each
7323.D2.13	Perform neuromuscular examination including levels of consciousness, upper/lower quarter scanning examination, cranial nerve examination, and reflex testing PTA-3.5 Define the purpose of the following diagnostic procedures and know when each should be performed: cerebral angiography, computed tomography, electroencephalography, electromyogram, evoked potential, lumbar puncture, MRI and MRA, Myelography, PET, Ventriculography, Electronystagmography
7323.D2.14	Recognize common neurologic dysfunctions, infectious diseases, and neural injuries affecting the neuromuscular system: cerebrovascular accident, transient ischemic attack, aneurysm, traumatic brain injury, spinal cord injury, syringomyelia, cauda equina syndrome, neurodegenerative, idiopathic inflammatory myopathies, epilepsy, cerebellar disorders, vestibular disorders, basal ganglia disorders, cranial and peripheral disorders, herniated lumbar disc, herpes zoster
7323.D2.15	Compare and contrast motor learning and theories of neurological rehabilitation

7323.D2.16	Student must demonstrate basic knowledge and proficiency working with the Cardiovascular system
7323.D2.17	Identify and know the function of the various component parts of the cardiovascular system including peripheral circulation, lymphatic system, heart, veins, and arteries, etc.
7323.D2.18	Perform basic cardiovascular examinations such as blood pressure, pulse, examination of heart sounds and heart rhythm
7323.D2.19	Practice exercise tolerance testing using Borg Rating of Perceived Exertion scale PTA-4.4 Be able to execute basic life support (CPR) and understand the significance of diagnostic tests: coronary angiogram, duplex ultrasonography, magnetic resonance venography, physiologic tests of venous function, Doppler ultrasound, air plethysmography, chest radiograph, myocardial perfusion imaging, continuous hemodynamic monitoring, echocardiography
7323.D2.20	Comprehend the variety of laboratory tests including enzyme studies, lipid profile, cellular blood elements and make evaluations based on them
7323.D2.21	Identify common cardiovascular conditions, peripheral arterial disease, vascular diseases, congestive heart failure, cardiomyopathy, coronary artery diseases, inflammatory conditions of the heart
7323.D2.22	Recognize common surgical interventions and cardiac rehabilitation
7323.D2.23	Student must demonstrate basic knowledge and proficiency working with the Pulmonary system
7323.D2.24	Identify the anatomy and physiology of the pulmonary system including but not limited to ribs, lungs, pleurae, and muscles
7323.D2.25	Understand the significance of pulmonary pathology and the variety of procedures performed to diagnose and characterize diseases of the pulmonary system
7323.D2.26	Recognize pulmonary obstructive diseases, infectious and inflammatory diseases, restrictive lung disease, pulmonary oncology, pulmonary vascular disease, and pleural diseases and disorders
7323.D2.27	Perform physical therapy interventions, medical management, and medical interventions specific to the pulmonary system
7323.D2.28	Student must demonstrate basic knowledge and proficiency working with the Integumentary system
7323.D2.29	Identify the anatomy and physiology of the integumentary system including dermis, epidermis, hair, glands, etc.
7323.D2.30	Describe the various pathologies of skin including eczema, dermatitis, bacterial, fungal, and parasitic infections, melanin pigmentary disorders, benign dermatoses, autoimmune disorders, skin cancer, ulcers
7323.D2.31	Perform wound care and identify factors influencing wound healing, include various non-physical therapy interventions as well
7323.D2.32	Understand the complexity of burns and complications that result from burns, including burn healing management
Domain	
7323.D3.1	Student must possess knowledge of basic pathology as it relates to physical therapy
7323.D3.2	Understand the role and importance of the immune system and identify its major organs and cells (e.g., antibodies, lymphocytes, etc.)
7323.D3.3	Identify various autoimmune and infectious diseases

7323.D3.4	Define the interconnectedness of various systems identified in previous standards with the immune system, in addition to including gastrointestinal system and genitourinary
7323.D3.5	Study hematologic blood disorders, endocrine and metabolic disorders
7323.D3.6	Examine various pathologies pertaining to obstetrics and gynecology
7323.D3.7	Review complex disorders such as chronic fatigue syndrome, fibromyalgia, myofascial complex regional pain and the role physical therapy may play with pain alleviation and maintenance
Domain	
7323.D4.1	Student will understand the significance of pediatric physical therapy and the role it has in child development
7323.D4.2	Describe the various developmental milestones from birth to adolescence
7323.D4.3	Identify automatic postural responses, primitive reflexes, motor control, and motor development
7323.D4.4	Review the commonly accepted theories of child development
7323.D4.5	Understand prenatal development and the significance of infant screening
7323.D4.6	Perform comprehensive developmental assessments, motor assessments, and assessments for children with disabilities
7323.D4.7	Review various pediatric acquired conditions, traumatic brain injury, congenital conditions, and pediatric oncology
7323.D4.8	Student will understand the significance of geriatric physical therapy and the role it has with the aging process
7323.D4.9	Understand the process of aging process and the commonly accepted theories of aging
7323.D4.10	Recognize the physiological changes and adaptations that occur, and the pathological conditions associated with aging
7323.D4.11	Identify common functional problems arising from the aging process and how physical therapy can improve the quality of life associated with these problems
7323.D4.12	Know the principals of geriatric rehabilitation and ethical and legal issues associated with working with this population
Domain	
7323.D5.1	Students will perform and be proficient in therapeutic exercise and modalities
7323.D5.2	Know the biomechanics of common exercises
7323.D5.3	Identify the physiology of muscles, muscle function and contraction
7323.D5.4	Create procedures and plans for improving strength, endurance, flexibility, balance, joint stabilization, and coordination within a variety of patients
7323.D5.5	Define modalities of therapeutic exercise including physical agents, hydrotherapy, electrotherapeutic modalities, mechanical modalities
7323.D5.6	Students will identify and understand the use of prosthetics and orthotics
7323.D5.7	Understand the levels of amputation
7323.D5.8	Perform activities to improve function and training of an amputee
7323.D5.9	Recognize lower limb and upper limb prosthetics and understand how they can replicate human movement
7323.D5.10	Identify various orthotics and the conditions they alleviate
7323.D5.11	Students will understand and practice basic pharmacology, gait, and functional training
7323.D5.12	Identify the role of pharmacotherapy and the most common pharmaceuticals used for patients

7323.D5.13	Define the temporal parameters and the gait cycle
7323.D5.14	Assist individuals with stair negotiation, wheelchairs, and bed mobility and transfers

Fitness Management Capstone		
Career Cluster	Health & Human Services	
Program of Study	Exercise Science/Physical Therapy	
NLPS Sequence	D	
Course Code	7324	
Course Description	*The Fitness Management Capstone course will focus on the knowledge and skills needed to be a personal trainer. This course will focus on the fundamental concepts in personal training for healthy general populations including topics of group fitness instruction and the principles and skills involved in management within the the health and fitness industry.*	
Prerequisite(s)/ Corequisite(s)	Principles of Exercise Science; Kinesiology; Human Performance	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Workplace Specialist: Physical Therapy	
REPA/REPA 3	● CTE: Health Occupations: Athletic Training 5-12 ● Workplace Specialist: Health Science – Athletic Training 9-12 ● Workplace Specialist: Physical Therapy 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 211: Nutrition*; CPTR 220: Health Screening and Exercise Program Design Across Populations*	
VU Course Alignment		
Four Yr. Course	USI - EXSC 396: Fitness Management	

Alignment	
Postsecondary Credential	ACSM Certified Personal Trainer, Certificate USI - B.A./B.S. in Exercise Science (31.0505)
Liberal Arts/Sciences Requirements	ENGL 111: English Composition, COMM 101: Fundamentals of Public Speaking or COMM 102: Introduction to Interpersonal Communication, IVYT 112: Student Success – Healthy Sciences and Nursing
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Nutrition***
7324.D1.1	List the basic elements of a healthy, balanced diet.
7324.D1.2	Identify the nutrients necessary for good nutrition and state the functions, requirements, and food sources for these macronutrients and micronutrients.
7324.D1.3	Demonstrate how nutritional needs change throughout the life cycle.
7324.D1.4	Explain how culture, ethnic, religious, and economic factors can alter food choices and consumption.
7324.D1.5	State how digestion and metabolism function effectively.
7324.D1.6	List the benefits and nutritional components of regular physical activity.
7324.D1.7	State the basic ways in which to assess nutritional status and intervene effectively.
7324.D1.8	Discuss disease states and treatments related to nutritional health.
7324.D1.9	Apply the basic principles of nutrition to create a diet plan.
7324.D1.10	Define a healthy body weight and explain methods used to assess body composition.
7324.D1.11	Explain the principles of weight management.
7324.D1.12	Demonstrate how to read a food label.
7324.D1.13	Recognize the importance of nutritional knowledge in all healthcare professions.
Domain	***Health Screening and Exercise Program Design Across Populations***
7324.D2.1	Discuss the principles of diagnostic exercise assessment.
7324.D2.2	Prepare exercise programming based on the recognition of exercise effects on one's physiology.
7324.D2.3	Implement proper interpersonal skills to effectively gain information on a symptomatic of asymptomatic client's health and lifestyle history.
7324.D2.4	Appl various methods of maximal and submaximal exercise testing, muscular strength and flexibility testing, and body composition measures.
7324.D2.5	Compare and contrast different measures of exercise testing so one may choose the appropriate testing methods for various populations.
7324.D2.6	Categorize at-risk clientele in order to develop an appropriate exercise program for various populations.
7324.D2.7	Present his or her clinical findings, testing results, and exercise recommendations in an oral and written format.
7324.D2.8	Explore and understand legal and ethical issues surrounding the scope of practice of a personal trainer.

7324.D2.9	Demonstrate skills through practical and written examinations.
7324.D2.10	Complete ACSM CPT Exam preparation.

Health & Human Services Human and Social Services							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7176	Principles of Human Services	7174	Understanding Diversity	7177	Relationships and Emotions	7241	Human Services Capstone

Principles of Human Services		
Career Cluster	Health & Human Services	
Program of Study	Human and Social Services	
NLPS Sequence	A	
Course Code	7176	
Course Description	*Principles of Human Services explores the history of human services, career opportunities, and the role of the human service worker. Focuses on target populations and community agencies designed to meet the needs of various populations. The course includes a required job shadowing project in a Human Services setting (a suggested four-hour minimum to meet Ivy Tech requirements). This course will also encourage cultural awareness and appreciation of diversity. Focuses on cultural variations in attitudes, values, language, gestures, and customs. Includes information about major racial and ethnic groups in the United States.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Any Home Economics K-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services	
Rules 46-47	● Consumer Homemaking Education 9-12 ***OR*** Occupational Education (FACS) 9-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services	
Rules 2002	● CTE: Family & Consumer Sciences 5-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or	

	additional training/PD in Social and Community Services ● Workplace Specialist: Human and Social Services ●CTE: Health Occupations 5-12 ●Workplace Specialist: Health Science – Nursing or EMS 9-12 ●Any Licensed School Social Worker ●Any Licensed School Counselor
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services ● Workplace Specialist: Human and Social Services ● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing or EMS 9-12 ● Any Licensed Social Worker ● Any License School Counselor
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HUMS 101: Intro to Human Services*
VU Course Alignment	SOCL 153: Introduction to Social Work*
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - TC Human Services (51.1502)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Human Services***
7176.D1.1	Discuss the development of the human service worker.
7176.D1.2	Examine the history of the human service profession.
7176.D1.3	Identify the relationship of the human services profession to social work and psychology.
7176.D1.4	Understand how the codes of ethics, as defined by the National Organization of Human Services and National Association of Social Workers, applies to helping professions.
7176.D1.5	Discuss cultural diversity and its impact on human services.
7176.D1.6	Understand the importance of and demonstrate professional behavior in terms of confidentiality, client autonomy, reliability, and responsibility.
7176.D1.7	Identify target populations and specific needs of these groups.
7176.D1.8	Formulate an understanding of the roles and range of services provided by a human service worker.

7176.D1.9	Compare careers and salary ranges available for human service workers.
7176.D1.10	Identify factors associated with burnout in human service workers.
Domain	
7176.D2.1	Analyze interpersonal skills and personal characteristics needed to interact effectively with individuals and families.
7176.D2.2	Identify ethical and legal issues faced by those in human and social service careers.
7176.D2.3	Classify harmful, fraudulent, and deceptive human services practices.
7176.D2.4	Demonstrate an understanding of how personal values, biases, and stereotypes may impact those in Human and Social Services careers.
7176.D2.5	Appraise how conflicts between a helping individual's personal values and the needs and behaviors of clients can be resolved
7176.D2.6	Analyze and document effective advocacy strategies used to overcome diverse challenges in the human services work setting
7176.D2.7	Students will explore and analyze the human services resources that are available within their community.
7176.D2.8	Observe and assist (as appropriate) an analysis of client strengths, needs, and goals across the life span through formal and informal assessment practices. (Could be a part of observation)
Domain	***Career Navigation***
7176.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7176.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7176.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7176.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7176.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7176.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7176.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7176.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7176.D5.1	Demonstrate computer literacy skills and basic computer functions.
7176.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.

7176.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7176.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Understanding Diversity		
Career Cluster	Health and Human Services	
Program of Study	Human and Social Services	
NLPS Sequence	B	
Course Code	7174	
Course Description	*Understanding Diversity encourages cultural awareness and appreciation of diversity. Focuses on cultural variations in attitudes, values, language, gestures, and customs. Includes information about major racial and ethnic groups in the United States.*	
Prerequisite(s)/ Corequisite(s)	Principles of Human Services	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes	***Note: The Human and Social Services pathway will be phased out with the 2026-2027 school year. Schools are encouraged to consider adoption of the Social and Community Services pathway.***	
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Any Home Economics K-12	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Human and Social Services	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Human and Social Services	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment	SOCL 164: Introduction to Multicultural Studies*	
Four Yr. Course		

Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Human Services***
7176.D1.1	Discuss the development of the human service worker.
7176.D1.2	Examine the history of the human service profession.
7176.D1.3	Identify the relationship of the human services profession to social work and psychology.
7176.D1.4	Understand how the codes of ethics, as defined by the National Organization of Human Services and National Association of Social Workers, apply to helping professions.
7176.D1.5	Discuss cultural diversity and its impact on human services.
7176.D1.6	Understand the importance of and demonstrate professional behavior in terms of confidentiality, client autonomy, reliability, and responsibility.
7176.D1.7	Identify target populations and specific needs of these groups.
7176.D1.8	Formulate an understanding of the roles and range of services provided by a human service worker.
7176.D1.9	Compare careers and salary ranges available for human service workers.
7176.D1.10	Identify factors associated with burnout in human service workers.
Domain	
7174.D1.1	Consider how factors like race, class, gender, and age can influence an individual's beliefs regarding social values and social justice.
7174.D1.2	Understand client(s) demographics and how to apply culturally appropriate methods of providing services for individuals and families.
7174.D1.3	Demonstrate awareness of one's own belief system and it's fit with social work values and ethics, including a commitment to economic and social justice.
7174.D1.4	Practice interpersonal skills appropriate for therapeutic interactions with individuals and families through case studies and role playing.
7174.D1.5	Demonstrate an understanding of how the interactions between an individual and their environment can impact interventions within the human services work setting.

Relationships and Emotions		
Career Cluster	Health and Human Services	
Program of Study	Human and Social Services	
NLPS Sequence	C	
Course Code	7177	
Course Description	*Relationship & Emotions examines the key elements of healthy relationships. Explores the main problems that damage relationships. Presents research findings on successful and unsuccessful relationships, and emotional connections. Explores the impact of one's emotional and relationship history on current and future romantic relationships. Presents practical, scientific-based skills for improving relationships. Additionally, this course offers practical and useful information for people who have experienced loss. Students have the opportunity to evaluate their own experiences and attitudes toward loss and grief.*	
Prerequisite(s)/ Corequisite(s)	Principles of Human Services	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes	***Note: The Human and Social Services pathway will be phased out with the 2026-2027 school year. Schools are encouraged to consider adoption of the Social and Community Services pathway.***	
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Any Home Economics K-12	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Human and Social Services	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Human and Social Services	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HUMS 140: Loss and Grief*	
VU Course Alignment	SOCL 261: Sociology of Relationships and Families*; SOCL 260: Sociological Aspects of Death*	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - TC Human Services (51.1502)	

Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Healthy Relationships***
7177.D1.1	Analyze purposes and expectations of various types of relationships in career, community, and family settings.
7177.D1.2	Examine and contrast characteristics and consequences of healthy and unhealthy relationships in career, community, and family settings.
7177.D1.3	Describe the main problems that damage relationships.
7177.D1.4	Examine research findings on successful and unsuccessful relationships.
7177.D1.5	Explain how couples can improve intimacy and romance.
7177.D1.6	Describe the process of emotional connection.
7177.D1.7	Examine the impact of one's emotional and relationship history.
7177.D1.8	Develop and apply effective communication skills.
7177.D1.9	Apply scientifically based skills for improving relationships
Domain	***Loss and Grief***
7177.D2.1	Define loss, grief, mourning, and bereavement.
7177.D2.2	Identify and explain common theories related to the grief and mourning process.
7177.D2.3	Explain the psychosocial needs of persons in bereavement.
7177.D2.4	Discuss issues related to children and loss.
7177.D2.5	Explain the function of the hospice movement.
7177.D2.6	Discuss ethical and moral issues related to loss and grief.
7177.D2.7	Identify complicated grief issues.
Domain	
7177.D3.1	Understand and apply conflict resolution skills to a variety of scenarios.
7177.D3.2	Understand the role of empathy, acceptance, and tolerance in healthy relationships.
7177.D3.3	Evaluate influences of personal needs and wants on relationships in career, community, and family settings.
7177.D3.4	Examine impacts of stress on relationships and identify stress management techniques.

Human Services Capstone	
Career Cluster	Health and Human Services
Program of Study	Human and Social Services

NLPS Sequence	D	
Course Code	7241	
Course Description	*This course provides opportunities to increase effectiveness in helping people. Examines the helping process in terms of skills, helping stages, and issues involved in a helping relationship. This course also introduces and develops basic interviewing skills. Includes assessment strategies and treatment planning. This course provides basic information about the problems of alcohol and other drug abuse. Explores symptoms and effects of abuse and dependence on individuals, families, and society Additionally, this course studies group dynamics, issues and behavior. Includes group functioning and leadership, guidelines on working effectively with a co-leader, and practical ways of evaluating the group processes. It provides an overview of legal and ethical aspects in the field of human services with implications for the human service worker. Includes topics such as confidentiality, rights of clients, client records, equal protection for staff and clients, and discrimination. The Human Service Ethical Code and related codes are covered with an overview of ethical dimensions of practice.*	
Prerequisite(s)/ Corequisite(s)	Relationships & Emotions; Understanding Diversity	
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes	***Note: The Human and Social Services pathway will be phased out with the 2026-2027 school year. Schools are encouraged to consider adoption of the Social and Community Services pathway.***	
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Any Home Economics K-12	
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Human and Social Services	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Human and Social Services	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HUMS 113: Substances and Addictions*; HUMS 155: Family and Community in Youth Work*	
VU Course Alignment	SOCL 180 - Addiction Disorders and Psychoactive Drugs*	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - TC Human Services (51.1502)	

Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Substances and Addictions***
7241.D1.1	Describe the nature of substance abuse and dependence.
7241.D1.2	Understand the motivation for using alcohol and other drugs.
7241.D1.3	Identify the major classifications of drugs and the physiological, psychological, and sociological effects of their use.
7241.D1.4	Recognize the etiology, symptoms, and treatment models of chemical addiction.
7241.D1.5	Understand the effects of chemical dependence on the family.
7241.D1.6	Identify laws pertaining to the major classifications of drugs.
7241.D1.7	Recognize the effects of substance abuse on fetal development.
7241.D1.8	Identify the effects and patterns of substance abuse in different populations.
7241.D1.9	Examine the use of psychotherapeutic drugs in our culture and evaluate its impact on our society.
7241.D1.10	Assess the pharmacological effects of psychoactive drugs on the central nervous system.
7241.D1.11	Compare the CNS naturally occurring psychoactive chemicals with those used illicitly.
7241.D1.12	Determine the effects of illicit drug use on the various organs of the body.
Domain	***Family and Community in Youth Work***
7241.D2.1	Discuss the role of community in empowering children and youth.
7241.D2.2	Identify diverse family systems in the multicultural setting.
7241.D2.3	Identify and analyze the stages of the family life cycle.
7241.D2.4	Identify and analyze the child in the family from the family systems approach.
7241.D2.5	Identify the ecological systems affecting the family.
7241.D2.6	Discuss, demonstrate, and analyze principles and techniques of culturally sensitive interpersonal skills for working with families.
7241.D2.7	Identify community and professional resources needed to support youth and their families.
7241.D2.8	Analyze specific family challenges in various types of families and cultural/religious settings.
7241.D2.9	Identify and assess family support systems within the community.
7241.D2.10	Identify, describe, and discuss stressors and potential stressors that may affect children, youth, and families.
7241.D2.11	Describe and reflect on the family strengths model.
7241.D2.12	Define and discuss the meaning of culture and cultural diversity.
7241.D2.13	Examine the impact of cultural stereotypes and prejudice.

7241.D2.14	Analyze the cultural impact of socioeconomic class and the cultural influence on time and space orientation.
Domain	***Introduction to Disabilities***
7241.D3.1	Present historical information about the field of disabilities and its impact on current services and approaches.
7241.D3.2	Identify the living and learning environments of individuals with disabilities.
7241.D3.3	Describe the difference between biological/genetic disabilities and those disabilities occurring through circumstance or environment.
7241.D3.4	Determine the process by which an individual with disability seeks out a diagnosis and receives services.
7241.D3.5	Identify and explain the characteristics of today's most prevalent disabilities.
7241.D3.6	Demonstrate an awareness of the social, legal, and ethical issues pertaining to individuals with developmental disabilities.
7241.D3.7	Appraise community resources for individuals with disabilities and list services available.
7241.D3.8	Examine the problems and difficulties associated with developmental delays, developmental psychopathology, and dual diagnosis.
7241.D3.9	Analyze the difficulties experienced by those with disabilities in their process of active socialization in the community.
7241.D3.10	Examine and categorize the effects of stress on families living with an individual with a disability.
7241.D3.11	Diagram the socioeconomic status of families/individuals living with disabilities.
7241.D3.12	Construct a chart showing the major disorders included in developmental disabilities and populations comparing the major difficulties experienced by each.
7241.D3.13	Categorize the needs for the individual with an autism spectrum disorder.
7241.D3.14	Compare and contrast the differences between treatments for individuals with disabilities over the years.
7241.D3.15	Debate how legislation has affected the rights and lives of those with disabilities over the years.
7241.D3.16	Examine how social attitudes have changed toward disabilities and individuals with disabilities throughout history.
7241.D3.17	Identify opportunities for individuals with disabilities.
7241.D3.18	Categorize helping profession concepts and their practical application in the delivery of services for disabled populations.
7241.D3.19	Identify terminology and acronyms used in Human Services and Special Populations.
Domain	***Additional***
7241.D4.1	Examine the societal attitudes shaping personal and public responses to substance use disorders.
7241.D4.2	Understand the history of the addiction profession.
7241.D4.3	Describe classification models of psychoactive drugs.
7241.D4.4	Compare the effects of psychoactive drug use.

7241.D4.5	Explain the basic components of the theories and models utilized to explain substance use disorders.
Domain	
7241.D5.1	Compare differences between needs of an adult with disabilities to a youth with disabilities.
7241.D5.2	Understand financial needs and support for those with disabilities.
7241.D5.3	Collaborate with staff to determine appropriate resources available within agency
7241.D5.4	Collaborate with staff to determine appropriate resources from other area agencies
7241.D5.5	Communicate with client to emphasize the importance of friends, family, and community relationships

Health & Human Services Pharmacy							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7137	Principles of Pharmacy Tech	5274	Healthcare Fundamentals	7167	Pharmacy Tech	7310	Pharmacy Capstone

Principles of Pharmacy Tech	
Career Cluster	Health & Human Services
Program of Study	Pharmacy
NLPS Sequence	A
Course Code	7137
Course Description	*Principles of Pharmacy Tech is an introduction to the principles of pharmacotherapy including basic pharmacology, medication management, and safety. Students will be introduced to various systems of the human body and the most important drugs affecting these systems. Students will develop an understanding of drug classes and their mechanism of action when prescribed for a particular disease state. This course will also introduce the essential mathematical concepts and skills needed for pharmacy practice. Students will be introduced to metric, avoirdupois, and apothecary systems of measurements. Other calculation methods that will be studied are ratio and proportion, dimensional analysis, and calculations for compounded products.*
Prerequisite(s)/ Corequisite(s)	None
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas

Dual Credit Status	X (PCL/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Pharmacy 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment	PHRM 105: Pharmacology ; PHRM 220: Pharmacy Calculations	
Four Yr. Course Alignment		
Postsecondary Credential	VU - C.G. Pharmacy Technology (51.0805); Pharmacy Technology, C.P.C.	
Liberal Arts/Sciences Requirements		
Promoted Certifications	Certified Pharmacy Tech (CPhT)	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Pharmacology***	
7137.D1.1	Demonstrate an understanding of terminology related to the study of pharmacology	
7137.D1.2	Identify the principles of safe and correct medication administration routes	
7137.D1.3	Recognize the drug regulations and legal aspects of drug prescription and administration	
7137.D1.4	Demonstrate key characteristics of body systems and drug therapies including administration, therapeutic effects, potential side effects, contraindication, and representative medications	
7137.D1.5	Understand the components of the medication management system	
7137.D1.6	Describe the processes of pharmacodynamics, pharmacokinetics, and therapeutic action	
Domain	***Pharmacy Calculations***	
7137.D2.1	Demonstrate and understanding of number systems and operations	
7137.D2.2	Execute pharmaceutical calculation of ratio, percent, and proportions	

7137.D2.3	Develop prescription and medication order literacy skills
7137.D2.4	Apply an understanding of measurement systems and conversions
7137.D2.5	Calculate dose for oral and injectable medications
7137.D2.6	Solve calculations for compounding and sterile solutions
7137.D2.7	Examine various mathematical concepts in business operations
Domain	***Career Navigation***
7137.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7137.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7137.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7137.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7137.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7137.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7137.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7137.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7137.D5.1	Demonstrate computer literacy skills and basic computer functions.
7137.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7137.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7137.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Healthcare Fundamentals	
Career Cluster	Health & Human Services
Program of Study	Central Service Technician, Certified Clinical Medical Assistant, Emergency Medical Services, Pharmacy, Pre-Nursing/Healthcare Specialist: Certfieid Nursing Aide (CNA)
NLPS Sequence	B

Course Code	5274	
Course Description	*Healthcare Fundamentals prepares students with language skills necessary for effective, independent use of health and medical reference materials. It includes the study of health and medical abbreviations, symbols, and Greek and Latin word part meanings, all taught within the context of body systems. This course builds skills in pronouncing, spelling, and defining new words encountered in verbal and written information in the healthcare industry. Additionally, the course introduces cells, tissues, and human anatomy highlighting essential physiological principles through a systemic approach. Students have the opportunity to acquire essential skills for accurate and logical communication, and interpretation of medical records.*	
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare or Principles of Pharmacy Tech	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● WS Dental Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12 ● Workplace Specialist: Dental Careers 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 101: Medical Terminology, HLHS 102: Essential Anatomy and Physiology	
VU Course Alignment	HIMT 110: Medical Terminology for Allied Health VU-EC – BIOL 107/L (Lab): Essentials of Human Anatomy and Physiology	
Four Yr. Course Alignment	BSU - NUR 101: Terminology for Health Care Professionals USI - HP 115: Medical Terminology for Health Professionals	
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711) VU - A.S. Nursing (51.3801), C.G. Health Care Professional - Pre-Nursing CNA Track (51.3801) VU-EC - A.S. Nursing (51.3801) USI – B.S. Nursing (51.3801) BSU – B.S. Respiratory Therapy (51.0908)	

Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Medical Terminology***
5274.D1.1	Demonstrate the use of a medical dictionary.
5274.D1.2	Define and properly use prefixes and suffixes with word roots and combining forms to build medical terms.
5274.D1.3	Define medical terms.
5274.D1.4	Locate and identify the organs within body systems and define their basic functions.
5274.D1.5	Define and use medical abbreviations, signs, and symbols accurately.
5274.D1.6	Define common diseases and conditions.
5274.D1.7	Identify selected procedures, treatments, and diagnostic tests.
5274.D1.8	Spell medical terms correctly.
5274.D1.9	Pronounce medical terms.
Domain	***Essential Anatomy and Physiology***
5274.D2.1	Apply basic knowledge of chemistry as pertinent to the human body.
5274.D2.2	Identify the major body systems and the organs which comprise each of them.
5274.D2.3	Summarize and define the basic structure and function of each of the body systems.
5274.D2.4	Demonstrate the ability to utilize a microscope to examine prepared slides and apply to physiological conditions and body systems.
5274.D2.5	Adapt the structural and functional aspects of cell organization to the body systems.
5274.D2.6	Classify the types and composition of the 4 basic types of body tissues.
5274.D2.7	Discuss and identify disease states in relation to body systems.

Pharmacy Tech	
Career Cluster	Health & Human Services
Program of Study	Pharmacy
NLPS Sequence	C
Course Code	7167
Course Description	*The Pharmacy Technician course introduces the student to the hands-on foundational principles, career concepts, and entry-level skills and duties typically performed by a pharmacy technician in community/retail, hospital/health system, and other pharmacy practice settings before actual on-site experiential training. Students will see computerized applications of prescription data entry, record keeping, and hands-on experience with drug distribution systems. Classroom and lab activities will provide opportunities for students to learn both administrative and clinical procedures such as filling prescriptions and*

	compounding medications. This course will also provide hands-on instructrion in the principles and preparations of sterile compounding and aseptic technique for compounded sterile products in a simulated lab setting. This includes experiences in mixing products under a laminar flow hood, practicing proper technique, and using proper supplies and equipment.
Prerequisite(s)/ Corequisite(s)	Principles of Pharmacy Tech
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas Counts as a quantitative reasoning course Fulfills a science requirement for all diploma types
Dual Credit Status	X (PCL/ CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	Moderate Value | Level I
Bulletin 400	● No License Available
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Pharmacy 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	PHRM 110- Dispensing Lab I▼ **;** PHRM 211 – Dispensing Lab II▼
Four Yr. Course Alignment	
Postsecondary Credential	VU - C.G. Pharmacy Technology (51.0805)
Liberal Arts/Sciences Requirements	ENGL 101: English Composition I; MATT 107: Applied Mathematics or MATT 109: Business Mathematics
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Dispensing Lab I***
7167.D1.1	Demonstrate the procedures and operations relating to processing prescriptions and preparing medications in a community and institutional pharmacy setting.

7167.D1.2	Apply entry and advanced level operations that include stock maintenance, inventory control, record keeping, and purchasing.
7167.D1.3	Prepare non-sterile compounds.
7167.D1.4	Develop advanced level skills in a community and institutional pharmacy setting.
7167.D1.5	Explain the importance of pharmacy resource materials.
Domain	***Dispensing Lab II***
7167.D2.1	Develop advance level skills in an institutional pharmacy setting.
7167.D2.2	Apply pharmaceutical calculations required for sterile compounding.
7167.D2.3	Demonstrate various aspects of aseptic technique including garbing, hand washing, and hood cleaning.
7167.D2.4	Prepare various compounded sterile preparations (CSP).
7167.D2.5	Describe the components of sterile compounding and aseptic technique as defined in terms of United States Pharmacopeia (USP) compliance guidelines.

Pharmacy Capstone		
Career Cluster	Health & Human Services	
Program of Study	Pharmacy	
NLPS Sequence	D	
Course Code	7310	
Course Description	*The Pharmacy Capstone courses builds upon the foundational knowledge learned in the Pharmacy Tech course. In addition to advanced pharmacology and dispensing labs, students will also explore Pharmacy law and ethics, management, and advanced pharmacology. Time is built into the capstone course to allow students to complete their practicum as well.*	
Prerequisite(s)/ Corequisite(s)	Principles of Pharmacy Tech; Healthcare Fundamentals; Pharmacy Tech	
Credits	2 semester course, 2 semesters required, 1-3 credit per semester, 6 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12	

	● Workplace Specialist: Health Science – Pharmacy 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	PHRM 115: Pharmacy Law and Ethics for Technicians; PHRM 200 – Pharmacy Management; PHRM 206: Advance Pharmacology; PHRM 225: Practicum for Advanced Level **OR** PHRM 226: Practicum for Entry Level
Four Yr. Course Alignment	
Postsecondary Credential	VU-EC - C.G. Pharmacy Technology (51.0805)
Liberal Arts/Sciences Requirements	ENGL 101: English Composition I; MATT 107: Applied Mathematics or MATT 109: Business Mathematics
Promoted Certifications	Certified Pharmacy Tech (CPhT)
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Pharmacy Law and Ethics for Techs***
7310.D1.1	Demonstrate an understanding of the foundation of law and ethics
7310.D1.2	Identify the principles of liability and ethics in a pharmacy setting
7310.D1.3	Apply federal regulations of drug products, Medicare, and Medicaid
7310.D1.4	Analyze the comprehensive Drug Abuse and Prevention Control Act
7310.D1.5	Examine the Health Insurance Portability and Accountability Act along with workplace safety and its laws
7310.D1.6	Apply state laws in a pharmacy practice
7310.D1.7	Demonstrate knowledge of the state boards of pharmacy and the Joint Commission
Domain	***Pharmacy Management***
7310.D2.1	Combine critical thinking skills, creativity, and innovation in solving problems frequently encountered in pharmacy practice.
7310.D2.2	Design a paper and presentation related to advanced pharmacy practices, emerging roles for pharmacy technicians or current dilemmas facing pharmacy practice.
7310.D2.3	Apply self-management skills.
7310.D2.4	Explain advanced pharmacy technician topics as they are expressed in the community and hospital setting.
7310.D2.5	Develop proper professionalism and communication skills.
7310.D2.6	Engage with other healthcare professionals through organizations.
Domain	***Advance Pharmacology***
7310.D3.1	Distinguish key characteristics of body systems and drug therapies including administration, therapeutic effects, potential side effects, contraindication and representative medications.
7310.D3.2	Understand the relationship between drug doses and patient unique drug responses.
7310.D3.3	Identify popular use of nutritional supplements and alternative medications.

7310.D3.4	Define emerging therapies in real-world pharmaceutics.
7310.D3.5	Identify cancer developments and drug therapies.
7310.D3.6	Prioritize the top 200 drugs for the current year.
7310.D3.7	Demonstrate an understanding of medications for the national exam.
Domain	***Practicum for Advanced Level***
7310.D4.1	Utilize proper person/interpersonal knowledge and skills in the clinical setting.
7310.D4.2	Apply foundational professional knowledge and skills throughout pharmacy settings.
7310.D4.3	Convert knowledge gained in classroom and laboratory settings to clinical practice.
7310.D4.4	Communicate effectively verbally and nonverbally with pharmacy and other healthcare professionals, preceptors, and university personnel.
7310.D4.5	Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs.
7310.D4.6	Apply knowledge gained to prepare for PTCB (Pharmacy Technician Certification Board) exam
Domain	***Practicum for Entry Level***
7310.D5.1	Utilize proper person/interpersonal knowledge and skills in the retail or outpatient setting.
7310.D5.2	Apply foundational professional knowledge and skills throughout retail or outpatient pharmacy settings.
7310.D5.3	Convert knowledge gained in classroom and laboratory settings to retail or outpatient practice.
7310.D5.4	Communicate effectively verbally and nonverbally with pharmacy and other healthcare professionals, preceptors, and university personnel.
7310.D5.5	Engage as a healthcare team member by demonstrating mutual respect, understanding and values to meet patient care needs.
7310.D5.6	Apply knowledge from the previous semesters to prepare for the PTCB (Pharmacy Technician Certification Board) exam.

Health & Human Services Pre-Nursing / Healthcare Specialist: Certified Nursing Aide (CNA)							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7168	Principles of Healthcare	5274	Healthcare Fundamentals	7166	Healthcare Specialist: CNA	7255	Healthcare Specialist Capstone

Principles of Healthcare		
Career Cluster	Health & Human Services	
Program of Study	Central Service Technician, Certified Clinical Medical Assistant, Emergency Medical Services, Pharmacy, Pre-Nursing/Healthcare Specialist: Certified Nursing Aide (CNA)	
NLPS Sequence	A	
Course Code	7168	
Course Description	*Principles of Healthcare content examines skills common to specific health career topics such as patient nursing care, dental care, animal care, medical laboratory, public health, and an introduction to healthcare systems. Lab experiences are organized and planned around the activities associated with the student's career objectives.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	HLHS 100: Intro to Healthcare, HLHS 104: CPR- Basic Life Support
VU Course Alignment	HSGN 102: Introduction to Health Careers
Four Yr. Course Alignment	USI - HP 211: The Healthcare Delivery System, KIN 192: Concepts in Wellness and Fitness IUB - SPH B150: Introduction to Public Health
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711) VU - C.G. Health Care Professional - Pre-Nursing CNA Track (51.3801) USI – B.S. in Community and Public Health (51.0701) IUB – B.S. in Public Health
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Healthcare Systems***
7168.D1.1	Describe how health care is developed, delivered, and organized.
7168.D1.2	Discuss health care delivery systems and trends.
7168.D1.3	Identify ethical and legal issues in health care.
7168.D1.4	Apply basic medical terminology principles.
7168.D1.5	Identify the basic organization of the human body, the body systems, and the stages of growth and development.
7168.D1.6	Analyze behaviors for success in the health care field, including lifestyles management, professionalism, and lifelong learning.
7168.D1.7	Describe personal and workplace safety measures including body mechanics, infection control, and environmental safety.
7168.D1.8	Discuss principles of communication in a health care setting including treating the patient with respect as an individual, accommodation of cultural diversity, identifying and providing for patient needs.
7168.D1.9	Identify the purposes and procedures for medical documentation.
7168.D1.10	Compare various health care occupations, including education requirements, credentialing or licensing, scope of practice, and workforce data.
Domain	***CPR / Basic Life Support***
7168.D2.1	Recognize cardiac vascular emergencies and/or respiratory arrest and take appropriate action.
7168.D2.2	Establish an airway and initiate ventilation.
7168.D2.3	Manage obstructed airway in adult, child, and infant.
7168.D2.4	Perform one and two-person adult, child and infant CPR using universal precautions.
7168.D2.5	Demonstrate the use of an Automated External Defibrillator (AED)
Domain	***Wellness Knowledge***
7168.D3.1	Define fitness/wellness and the major areas it encompasses.
7168.D3.2	Assess individuals' level of fitness (including blood pressure, resting heart rate, flexibility,

	muscle strength and endurance, body composition, and aerobic capacity).
7168.D3.3	Learn safe and effective exercise routines with proper technique.
7168.D3.4	Design a personal health and fitness plan and a healthy eating plan to incorporate into a healthy lifestyle.
7168.D3.5	Develop a behavior modification plan that would encourage individuals to exercise.
7168.D3.6	Discuss the wellness wheel and interrelatedness of stress, nutrition, exercise, and weight management for a healthy quality of life.
7168.D3.7	Discuss lifestyle choices and their effect on fitness and wellness with regard to disease, disease prevention, and substance abuse (holistic, prescription, and illegal drugs).
7168.D3.8	Provide guidelines for prescribing lifestyle changes to improve levels of wellness/fitness.
Domain	***Career Navigation***
7168.D4.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7168.D4.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7168.D4.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7168.D4.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7168.D5.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7168.D5.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7168.D5.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7168.D5.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7168.D6.1	Demonstrate computer literacy skills and basic computer functions.
7168.D6.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7168.D6.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7168.D6.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Healthcare Fundamentals	
Career Cluster	Health & Human Services
Program of Study	Central Service Technician, Certified Clinical Medical Assistant, Emergency Medical Services, Pharmacy, Pre-Nursing/Healthcare Specialist: Certified Nursing Aide (CNA)
NLPS Sequence	B

Course Code	5274	
Course Description	*Healthcare Fundamentals prepares students with language skills necessary for effective, independent use of health and medical reference materials. It includes the study of health and medical abbreviations, symbols, and Greek and Latin word part meanings, all taught within the context of body systems. Introduces cells, tissues, and human anatomy highlighting essential physiological principles through a systemic approach. Additionally, the course provides a general overview of basic concepts and terminology used in anatomy and physiology as applicable to health sciences and healthcare occupations. This course builds skills in pronouncing, spelling, and defining new words encountered in verbal and written information in the healthcare industry. Students have the opportunity to acquire essential skills for accurate and logical communication, and interpretation of medical records. Emphasis is on forming a foundation of a medical vocabulary including appropriate and accurate meaning, spelling, and pronunciation of medical terms, abbreviations, signs, and symbols.*	
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare or Principles of Pharmacy Tech	
Credits	2 semester course, 2 semesters required, 1 credit per semester, maximum of 2 credits	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers ● Workplace Specialist: Dental Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Any Health Careers license 9-12 ● Workplace Specialist: Dental Careers 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 101: Medical Terminology, HLHS 102: Essential Anatomy and Physiology	
VU Course Alignment	HIMT 110: Medical Terminology for Allied Health VU-EC – BIOL 107/L (Lab): Essentials of Human Anatomy and Physiology	
Four Yr. Course Alignment	BSU - NUR 101: Terminology for Health Care Professionals and Consumers USI - HP 115: Medical Terminology for Health Professionals	
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711) VU - A.S. in Nursing (51.3801), C.G. Health Care Professional - Pre-Nursing CNA Track	

	(51.3801) VU-EC - A.S. in Nursing (51.3801) USI – B.S. in Nursing (51.3801) BSU - B.S. in Respiratory Therapy (51.0908)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Medical Terminology***
5274.D1.1	Demonstrate the use of a medical dictionary.
5274.D1.2	Define and properly use prefixes and suffixes with word roots and combining forms to build medical terms.
5274.D1.3	Define medical terms.
5274.D1.4	Locate and identify the organs within body systems and define their basic functions.
5274.D1.5	Define and use medical abbreviations, signs, and symbols accurately.
5274.D1.6	Define common diseases and conditions.
5274.D1.7	Identify selected procedures, treatments, and diagnostic tests.
5274.D1.8	Spell medical terms correctly.
5274.D1.9	Pronounce medical terms.
Domain	***Essential Anatomy and Physiology***
5274.D2.1	Apply basic knowledge of chemistry as pertinent to the human body.
5274.D2.2	Identify the major body systems and the organs which comprise each of them.
5274.D2.3	Summarize and define the basic structure and function of each of the body systems.
5274.D2.4	Demonstrate the ability to utilize a microscope to examine prepared slides and apply to physiological conditions and body systems.
5274.D2.5	Adapt the structural and functional aspects of cell organization to the body systems.
5274.D2.6	Classify the types and composition of the 4 basic types of body tissues.
5274.D2.7	Discuss and identify disease states in relation to body systems.

Healthcare Specialist: CNA	
Career Cluster	Health & Human Services
Program of Study	Pre-Nursing/Healthcare Specialist: Certfied Nursing Aide (CNA)
NLPS Sequence	C
Course Code	7166
Course Description	*The Healthcare Specialist: CNA course prepares individuals desiring to work as nursing assistants with the knowledge, skills, and attitudes essential for providing basic care in extended care facilities, hospitals, and home health agencies under the direction of licensed*

	nurses. The course will introduce students to the disease process and aspects of caring for a long-term care resident with dementia. Individuals who successfully complete this course are eligible to apply to sit for the Indiana State Department of Health (ISDH) certification exam for nursing assistants. This course meets the minimum standards set forth by the ISDH for Certified Nursing Assistant (CNA) training and for health care workers in long-term care facilities.
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X (PCL/ CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level I
Bulletin 400	● No License Available
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation with exception of Nurse's Aide & Licensed Practical Nurse 9-12
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HLHS 107: CNA Preparation, HLHS 113: Dementia Care
VU Course Alignment	HSGN 200: Nurse Assistant Preparatory Course ; HSGN 106: Dementia Care
Four Yr. Course Alignment	
Postsecondary Credential	ITCC: CT Certified Nursing Aide (51.3902) VU – CG Health Care Professional – Pre-Nursing CNA track (51.3801)
Liberal Arts/Sciences Requirements	ITCC- APHY 101: Anatomy and Physiology I, ENGL 111: English Composition, PSYC 101: Introduction to Psychology, IVYT 112: Student Success in Healthcare
Promoted Certifications	Certified Nursing Aide (CNA)
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***CNA Skills***
7166.D1.1	Demonstrate an understanding of the role of the nursing assistant in health care.

7166.D1.2	Identify and demonstrate beginning nursing assistant knowledge, skills and attitudes for the provision of quality nursing care.
7166.D1.3	Demonstrate communication techniques appropriate to a nursing assistant.
7166.D1.4	Perform resident care procedures according to the Indiana State Department of Health standards.
7166.D1.5	Utilize knowledge of the legal and ethical aspects of health care related to the responsibilities as a nursing assistant and member of the health care team.
7166.D1.6	Apply basic math skills to patient care situations.
7166.D1.7	Apply knowledge of Infection Control Standard Operating Procedures, visitation guidelines for Long-term Care Facilities and proper use of PPE in the practice of skills and during supervised clinical experience.
Domain	***Dementia Care***
7166.D2.1	Identify the major components of the dementia disease process and its treatment.
7166.D2.2	Discuss how dementia affects patient behavior.
7166.D2.3	Define different types of communication and why each type is important.
7166.D2.4	Identify the key issues of keeping the environment safe for a person with dementia.
7166.D2.5	Identify methods of involving the family in the care of a patient with dementia.
7166.D2.6	Identify the components of planning care and activities that are meaningful to the client with dementia.
7166.D2.7	Discuss appropriate communication techniques in dealing with a resident with dementia.
7166.D2.8	Discuss the impact of the death of a patient/resident.

Healthcare Specialist Capstone	
Career Cluster	Health & Human Services
Program of Study	Emergency Medical Services, Pre-Nursing/Healthcare Specialist: Certified Nursing Aide (CNA), Certified Clinical Medical Assistant
NLPS Sequence	D
Course Code	7255
Course Description	*The Healthcare Specialist Capstone course will facilitate healthcare students' acquisition of additional knowledge and skills necessary to work in a variety of healthcare settings beyond a long term care facility including hospitals, doctors' offices, and clinics. Students can accomplish this goal by completing coursework that will cover topics such as Medical Law and Ethics, Electronic Health Records, and/or Behavioral Health. Schools may offer additional healthcare certifications such as the Certified Clinical Medical Assistant (CCMA) or Phlebotomy along with the coursework or in place of the coursework.*
Prerequisite(s)/ Corequisite(s)	Principles of Healthcare; Healthcare Fundamentals; Healthcare Specialist: CNA, EMT or Certified Clinical Medical Assistant (CCMA)
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max
Counts Toward	Counts as a Directed Elective or Elective for all diplomas

Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● Any Standard Health Occupations License 9-12 ● Any Occupational Specialist I, II or III in Health Occupation: First Responder 9-12	
Rules 2002	● CTE: Health Occupations with high school setting ● Workplace Specialist: Health Careers	
REPA/REPA 3	● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Emergency Medical Services 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HLHS 105: Medical Law and Ethics, HLHS 122: Electronic Health Records, HLHS 125: Behavioral Health	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - TC Healthcare Specialist (51.0711)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	Certified Medical Assistant (CMA)	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Medical Law and Ethics***	
7255.D1.1	Explain how professional standards, laws, and ethics guide behavior for health care professionals in medical practices, hospitals, long term care facilities, clinics, and in emergency service settings.	
7255.D1.2	Compare and contrast concepts related to ethics, bioethics, and law.	
7255.D1.3	Discuss the United States legal system and processes as they relate to medical practice.	
7255.D1.4	Describe the current health care environment including types of practices, licensing, and certification of health care professionals.	
7255.D1.5	Defend the right of physicians and their patients as protected by federal and state laws.	
7255.D1.6	Detail federal and state statutes pertinent to health care professionals in the areas of hiring and employment, safety, patient privacy and confidentiality, consumer protection, and public records/reporting.	
7255.D1.7	Outline the public duties expected of physicians in the areas of reporting, legal records,	

	management of controlled substances, and the Good Samaritan laws.
7255.D1.8	Outline appropriate risk management procedures in regard to minimizing litigation and practicing within legal boundaries.
Domain	***Electronic Health Records***
7255.D2.1	Acquire, store, and retrieve patient information from the EHR database.
7255.D2.2	Execute, manage EHR database and maintain software and hardware including updates and file maintenance (e.g., purging, archiving).
7255.D2.3	Operate integrated devices with EHR software (e.g., scanners, fax machine, signature pads, and cameras) to transmit patient data for external use (e.g., insurance, pharmacies, and other providers).
7255.D2.4	Access clinical vocabularies in a health information system when appropriate and comply with patient safety standards regarding abbreviations in the health information system.
7255.D2.5	Generate Insurance verifications, patient statements, encounter forms/super bills, and face/admission sheets.
7255.D2.6	Retrieve diagnosis and procedural descriptions from medical records, enter codes and billing information into the EHR, and post payments to patient accounts at the time of visit.
7255.D2.7	Understand how to find codes in the ICD, CPT and HCPCS manuals.
7255.D2.8	Review charts to ensure compliance of proper charting, report to the proper enforcement office, and document the link between effective charting and reimbursement for procedures performed by clinicians.
7255.D2.9	Adhere to professional standards of care, including HIPAA Privacy & Security Rules and facility policy, as they pertain to medical records.
7255.D2.10	Generate reports for clinical and financial resources (e.g., aging report and financial analysis).
7255.D2.11	Compile and maintain medical care and census data for continuity of care records (e.g., reports on diseases treated, surgery performed, and use of hospital beds for clinical audits).
7255.D2.12	Provide ongoing end-user training and technical support of EHR software.
7255.D2.13	Execute EHR workflow, patient flow within the office (e.g., scheduling, patient registration and verification, patient referrals.
7255.D2.14	Use proper privileges and develop clinical templates from existing searchable databases.
Domain	***Behavioral Health***
7255.D3.1	Identify theories and demonstrate fundamental knowledge of biological, sociological, cultural, psychological, and spiritual development across the adult lifespan.
7255.D3.2	Define and discuss the impact of culture, diversity, and social justice as they pertain to perception and treatment of behavioral health concerns and aging.
7255.D3.3	Examine lifestyle behaviors associated with the development of chronic behavioral health illnesses.
7255.D3.4	Discuss and identify treatment options, pharmacological and non-pharmacological interventions of psychological and behavioral disorders for the following: Anxiety, Stress Disorders, Disorders of Mood, Eating Disorders, Substance Use and Addictive Disorders, Disorders of Aging and Cognition, exhibiting expression or indications of distress (i.e., anxiety, striking out, self-isolating, etc.)
7255.D3.5	Identify types and classes of drugs related to the treatment of selected behaviors and abnormal behaviors, including potential complications from drug interactions.
7255.D3.6	Discuss and define parameters of therapeutic touch and communication.
7255.D3.7	Demonstrate general and specific verbal interventions used to support patient treatment and

	recovery.
7255.D3.8	Demonstrate understanding of caregiver behaviors which support low conflict interactions with patients.
7255.D3.9	Identify strategies for behavioral health promotion and interprofessional collaborative practice when interacting with patients with behavioral health issues.
7255.D3.10	Describe and discuss the dying process, the definition of death, and the stages of grief as they apply to caregivers.
Domain	***Healthcare Specialist Certifications***
7255.D4.1	Certified Nursing Assistant (CNA)
7255.D4.2	Emergency Medical Technician (EMT)
7255.D4.3	Certified Clinical Medical Assistant (CCMA)
7255.D4.4	Phlebotomy (dual enrollment only)
7255.D4.5	Electrocardiography (dual enrollment only)

Health & Human Services Social and Community Services							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7176	Principles of Human Services	7276	Fundamentals of Human Services	7278	Community Health Worker	7279	Social and Community Services Capstone

Principles of Human Services		
Career Cluster	Health & Human Services	
Program of Study	Social and Community Services	
NLPS Sequence	A	
Course Code	7176	
Course Description	*Principles of Human Services explores the history of human services, career opportunities, and the role of the human service worker. Focuses on target populations and community agencies designed to meet the needs of various populations. The course includes a required job shadowing project in a Human Services setting (a suggested four-hour minimum to meet Ivy Tech requirements). This course will also encourage cultural awareness and appreciation of diversity. Focuses on cultural variations in attitudes, values, language, gestures, and customs. Includes information about major racial and ethnic groups in the United States.*	
Prerequisite(s)/Co-Requisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Any Home Economics K-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services	
Rules 46-47	● Consumer Homemaking Education 9-12 **OR** Occupational Education (FACS) 9-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services	

Rules 2002	● CTE: Family & Consumer Sciences 5-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services ● Workplace Specialist: Human and Social Services ● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing or EMS 9-12 ● Any licensed school social worker ● Any licensed school counselor
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services ● Workplace Specialist: Human and Social Services ● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing or EMS 9-12 ● Any licensed school social worker ● Any licensed school counselor

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HUMS 101: Introduction to Human Services
VU Course Alignment	SOCL 153: Introduction to Social Work*
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Mental Health Direct Support, TC Human Services (51.1502)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Human Services***
7176.D1.1	Discuss the development of the human service worker.
7176.D1.2	Examine the history of the human service profession.
7176.D1.3	Identify the relationship of the human services profession to social work and psychology.
7176.D1.4	Understand how the codes of ethics, as defined by the National Organization of Human Services and National Association of Social Workers, applies to helping professions.
7176.D1.5	Discuss cultural diversity and its impact on human services.
7176.D1.6	Understand the importance of confidentiality, client autonomy, reliability, and responsibility.
7176.D1.7	Identify target populations and specific needs of these groups.
7176.D1.8	Formulate an understanding of the roles of the human service worker.

7176.D1.9	Compare careers and salary ranges available for human service workers.
7176.D1.10	Identify factors associated with burnout in human service workers.
Domain	***Career Navigation***
7176.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7176.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7176.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7176.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7176.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7176.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7176.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7176.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7176.D4.1	Demonstrate computer literacy skills and basic computer functions.
7176.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7176.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7176.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Fundamentals of Human Services	
Career Cluster	Health & Human Services
Program of Study	Social and Community Services
NLPS Sequence	B
Course Code	7276
Course Description	Fundamentals of Human Services examines key elements of effective delivery of human services. Topics of discussion include personal values, helping relationships, the impact of diversity, theories of helping, communication, problem-solving processes, crisis situations,

	abuse, and professional ethics. This course also provides training for identifying characteristics of a crisis and basic crisis intervention skills. Students will evaluate their own personal strengths and limitations and discuss the importance of professional development for the human services social worker.
Prerequisite(s)/Co-Requisite(s)	None
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Any Home Economics K-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services	
Rules 46-47	● Consumer Homemaking Education 9-12 ***OR*** Occupational Education (FACS) 9-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services	
Rules 2002	● CTE: Family & Consumer Sciences 5-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services ● Workplace Specialist: Human and Social Services ● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing or EMS 9-12 ● Any licensed school social worker ● Any licensed school counselor	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services ● Workplace Specialist: Human and Social Services ● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing or EMS 9-12 ● Any licensed school social worker ● Any licensed school counselor	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HUMS 104: Crisis Intervention ; HUMS 140: Loss and Grief
VU Course Alignment	
Four Yr. Course Alignment	

Postsecondary Credential	ITCC - CT Mental Health Direct Support, TC Human Services (51.1502)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Crisis Intervention***
7276.D1.1	Identify the major characteristics and elements of a crisis.
7276.D1.2	Identify and demonstrate basic crisis intervention skills including coping and problem-solving methods.
7276.D1.3	Describe specific crisis situations such as suicide, sexual assault, child and elder abuse, chemical dependency, AIDS/HIV, and post-traumatic stress disorder.
7276.D1.4	Identify and compare specific treatment strategies and models.
7276.D1.5	Identify and categorize community agencies that deal with different crisis situations and examine the types of services available.
7276.D1.6	Recognize the importance of assessment in the crisis intervention process.
Domain	***Loss and Grief***
7276.D2.1	Define loss, grief, mourning, and bereavement.
7276.D2.2	Identify and explain common theories related to the grief and mourning process.
7276.D2.3	Explain the psychosocial needs of persons in bereavement.
7276.D2.4	Discuss issues related to children and loss.
7276.D2.5	Explain the function of the hospice movement.
7276.D2.6	Discuss ethical and moral issues related to loss and grief.
7276.D2.7	Identify complicated grief issues.

Community Health Worker (Advanced Social and Community Services)**	
Career Cluster	Health & Human Services
Program of Study	Social and Community Services
NLPS Sequence	C
Course Code	7278
Course Description	Community Health Worker (Advance Social and Community Services) provides students with the opportunity to increase their effectiveness in helping people. Students will examine the helping process in terms of skill, helping stages, and issues involved in a helping relationship. Additionally, background knowledge of the field of intellectual and developmental disabilities

	and issues pertaining to the field will be provided. **NOTE: Due to an adjustment in postsecondary alignment for this pathway, the course title will be adjusted following the 25-26 school year.
Prerequisite(s)/Co-Requisite(s)	Principles of Human Services
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Any Home Economics K-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services	
Rules 46-47	● Consumer Homemaking Education 9-12 ***OR*** Occupational Education (FACS) 9-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services	
Rules 2002	● CTE: Family & Consumer Sciences 5-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services ● Workplace Specialist: Human and Social Services ● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing or EMS 9-12 ● Any licensed school social worker ● Any licensed school counselor	
REPA/REPA 3	●CTE: Family & Consumer Sciences 5-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services ● Workplace Specialist: Human and Social Services ● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing or EMS 9-12 ● Any licensed school social worker ● Any licensed school counselor	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HUMS 102: Helping Relationship Techniques ; HUMS 116: Introduction to Disabilities
VU Course Alignment	
Four Yr. Course Alignment	

Postsecondary Credential	ITCC - CT Mental Health Direct Support, TC Human Services (51.1502)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Helping Relationship Techniques***
7278.D1.1	Recognize trends that affect the delivery of human services.
7278.D1.2	Identify personal values.
7278.D1.3	Develop an understanding of the helping relationship.
7278.D1.4	Explore the impact of cultural and ethnic diversity.
7278.D1.5	Understand various theories of helping, including systems theory, behaviorism, humanistic approaches, and cognitive behavior therapy.
7278.D1.6	Identify the characteristics of a helping relationship.
7278.D1.7	Compare and contrast the difference between a helping relationship and a friendship.
7278.D1.8	Identify forms of nonverbal communication.
7278.D1.9	Diagram the basic problem-solving process.
7278.D1.10	Demonstrate specific skills and techniques used in the helping process.
7278.D1.11	Evaluate personal strengths, limitations, and discuss the importance of professional development for the human services worker.
7278.D1.12	Examine case management and referral processes.
7278.D1.13	Apply ethical decision making models and various codes of ethics to case study scenarios.
Domain	***Introduction to Disabilities***
7278.D2.1	Present historical information about the field of disabilities and its impact on current services and approaches.
7278.D2.2	Identify the living and learning environments of individuals with disabilities.
7278.D2.3	Describe the difference between biological/genetic disabilities and those disabilities occurring through circumstance or environment.
7278.D2.4	Determine the process by which an individual with disability seeks out a diagnosis and receives services.
7278.D2.5	Identify and explain the characteristics of today's most prevalent disabilities.
7278.D2.6	Demonstrate an awareness of the social, legal, and ethical issues pertaining to individuals with developmental disabilities.
7278.D2.7	Appraise community resources for individuals with disabilities and list services available.
7278.D2.8	Examine the problems and difficulties associated with developmental delays, developmental psychopathology, and dual diagnosis.

7278.D2.9	Analyze the difficulties experienced by those with disabilities in their process of active socialization in the community.
7278.D2.10	Examine and categorize the effects of stress on families living with an individual with a disability.
7278.D2.11	Diagram the socioeconomic status of families/individuals living with disabilities.
7278.D2.12	Construct a chart showing the major disorders included in developmental disabilities and populations comparing the major difficulties experienced by each.
7278.D2.13	Categorize the needs for the individual with an autism spectrum disorder.
7278.D2.14	Compare and contrast the differences between treatments for individuals with disabilities over the years.
7278.D2.15	Debate how legislation has affected the rights and lives of those with disabilities over the years.
7278.D2.16	Examine how social attitudes have changed toward disabilities and individuals with disabilities throughout history.
7278.D2.17	Identify opportunities for individuals with disabilities.
7278.D2.18	Categorize helping profession concepts and their practical application in the delivery of services for disabled populations.
7278.D2.19	Identify terminology and acronyms used in Human Services and Special Populations.

Social and Community Services Capstone	
Career Cluster	Health & Human Services
Program of Study	Social and Community Services
NLPS Sequence	D
Course Code	7279
Course Description	Social and Community Services Capstone introduces professional development and employment opportunities for Community Health Workers and Case Managers. The course includes assessment strategies and treatment planning in addition to examining theories and research related to behavioral health and abnormal behavior in the healthcare setting. Primary emphasis will be on symptoms, communication strategies, and interaction with individuals. The course will explore fundamental concepts of diversity, intellectual and developmental disabilities, addiction, and wellness as they apply to quality of life across the adult lifespan. In this course students will explore care coordination, case management, coaching, cultural competencies, Human Services Code of Ethics, and issues pertaining to community social services. This course will provide practical and useful information regarding service availability and community resources for individuals and families' quality of life.
Prerequisite(s)/Co-Requisite(s)	Principles of Human Services; Fundamentals of Human Services; Community Health Worker (Advanced Social and Community Services)

Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	●Any Home Economics K-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services	
Rules 46-47	● Consumer Homemaking Education 9-12 **OR** Occupational Education (FACS) 9-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services	
Rules 2002	●CTE: Family & Consumer Sciences 5-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services ● Workplace Specialist: Human and Social Services ● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing or EMS 9-12 ● Any licensed school social worker ● Any licensed school counselor	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 with a Human Services concentration, non-teaching occupational experience in a social or community services provider role, or additional training/PD in Social and Community Services ● Workplace Specialist: Human and Social Services ● CTE: Health Occupations 5-12 ● Workplace Specialist: Health Science – Nursing or EMS 9-12 ● Any licensed school social worker ● Any licensed school counselor	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HUMS 113: Substances and Addictions; HUMS 162: Community Health Worker; HUMS 103: Interviewing and Assessment*; HUMS 205: Theories of Behavior Modification*	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - TC Mental Health Direct Support (51.1502)	
Liberal Arts/Sciences Requirements		
Promoted	Indiana Human Health Care Certification	

Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Substances and Addictions***
7279.D1.1	Describe the nature of substance abuse and dependence.
7279.D1.2	Understand the motivation for using alcohol and other drugs.
7279.D1.3	Identify the major classifications of drugs and the physiological, psychological, and sociological effects of their use.
7279.D1.4	Recognize the etiology, symptoms, and treatment models of chemical addiction.
7279.D1.5	Understand the effects of chemical dependence on the family.
7279.D1.6	Identify laws pertaining to the major classifications of drugs.
7279.D1.7	Recognize the effects of substance abuse on fetal development.
7279.D1.8	Identify the effects and patterns of substance abuse in different populations.
7279.D1.9	Examine the use of psychotherapeutic drugs in our culture and evaluate its impact on our society.
7279.D1.10	Assess the pharmacological effects of psychoactive drugs on the central nervous system.
7279.D1.11	Compare the CNS naturally occurring psychoactive chemicals with those used illicitly.
7279.D1.12	Determine the effects of illicit drug use on the various organs of the body.
Domain	***Community Health Worker***
7279.D2.1	Complete the Community Health Workers end of course assessment by demonstrating competencies in the following areas: • Communication & Motivational Interviewing • Interpersonal and Relationship Building • Service Coordination, Navigation, and Referrals • Capacity Building • Advocacy & Client Centered Care • Education and Facilitation • Individual and Community Assessment • Outreach • Professional Skills, Conduct, & Self-Care • Goal Setting & Treatment Planning • Working with diverse populations • Application of the LEARN model • Define Chronic Disease Signs & Symptoms • Trauma Informed Care
7279.D2.2	Demonstrate advanced professional writing skills in case management.
7279.D2.3	Explore professional development and employment opportunities for Community Health Workers and Case Managers.
7279.D2.4	Demonstrate understanding of the CHW Code of Ethics, HIPAA, confidentiality, and informed consent, and functioning within a multidisciplinary team.

Domain	**Interviewing and Assessment**
7279.D3.1	Demonstrate basic attending skills
7279.D3.2	Learn and demonstrate appropriate use of open and closed questions
7279.D3.3	Recognize various forms of verbal and nonverbal behavior in clients
7279.D3.4	Demonstrate appropriate use of paraphrasing
7279.D3.5	Understand and practice eliciting and reflecting feelings
7279.D3.6	Identify the steps of the interview process
7279.D3.7	Recognize the appropriate use of confrontation
7279.D3.8	Evaluate the appropriate use of self-disclosure
7279.D3.9	Recognize the components of a psychosocial assessment
7279.D3.10	Collect accurate documentation
7279.D3.11	Identify beginning concepts of case management
7279.D3.12	Apply beginning skills in interviewing for psychological and social problems, resources, and strengths
Domain	**Theories of Behavior Modification**
7279.D4.1	Discuss behavioral theories and terminology.
7279.D4.2	Compare and contrast models of behavioral change.
7279.D4.3	Analyze effectiveness of theories used for changing behavior.
7279.D4.4	Develop theoretical orientation for effective behavior-changing strategies.
7279.D4.5	Acquire skills needed to specify a target behavior and develop a baseline.
7279.D4.6	Be able to formulate realistic and measurable goals.
7279.D4.7	Evaluate techniques used to increase or decrease behavior.
7279.D4.8	Display understanding of and when to use techniques such as designing a behavioral contract and evaluating effectiveness of plan and need for modification.

Hospitality, Events, & Tourism

Introduction to Culinary Arts and Hospitality	
Career Cluster	Hospitality, Events, & Tourism
Program of Study	
NLPS Sequence	Introductory
Course Code	5438
Course Description	*Introduction to Culinary Arts and Hospitality is recommended for all students regardless of their career cluster or pathway, in order to build basic culinary arts knowledge and skills. It is especially appropriate for students with an interest in careers related to Hospitality, Tourism, and Culinary Arts. A project-based approach that utilizes higher order thinking, communication, leadership, and management processes is recommended. Topics include basic culinary skills in the foodservice industry, safety and sanitation, nutrition, customer relations and career investigation. Students are able to explore this industry and examine their own career goals in light of their findings. Laboratory experiences that emphasize industry practices and develop basic skills are required components of this course.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1-2 semester course, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	Introductory
Bulletin 400	● Any Home Economics K-12
Rules 46-47	● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II, & III: Food Production & Management 9-12
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Culinary Arts & Food Specialist
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Culinary Arts 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	

VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
5438.D7.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
5438.D7.2	Explain the benefits and responsibilities of being a member of a CTSO.
5438.D7.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5438.D7.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
5438.D8.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
5438.D8.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster
5438.D8.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
5438.D8.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society
5438.D8.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest
5438.D8.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
5438.D8.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster
Domain	***Successful Customer Relations***
5438.D1.1	Students will analyze the importance of communication and customer service to promote success in the food service industry.
5438.D1.2	Explain the importance of customer service and satisfaction for culinary and hospitality industry success

5438.D1.3	Demonstrate basic table service techniques, including table setting, serving and removing food and beverage items, and delivering the check
5438.D1.4	Demonstrate ability to communicate effectively with customers and co-workers
5438.D1.5	Calculate sales-tax-tip totals, cash register and final receipts, and average sales per customer
Domain	***Preventing Accidents and Injuries***
5438.D2.1	Students will apply concepts of emergency procedures to develop a safe working environment.
5438.D2.2	Investigate the role of Occupational Safety and Health Administration (OSHA) regulations
5438.D2.3	Demonstrate ability to ensure electrical and fire safety when using food preparation and service equipment
5438.D2.4	Demonstrate accident prevention techniques when using food preparation and service equipment
5438.D2.5	Select and apply appropriate basic first aid procedures
Domain	***Preparing and Serving Safe Food***
5438.D3.1	Students will demonstrate appropriate sanitation techniques to ensure high quality food service.
5438.D3.2	Demonstrate good personal hygiene and evaluate its effects on food safety
5438.D3.3	Identify symptoms and prevention methods of foodborne illness.
5438.D3.4	Demonstrate procedures and conditions to control microorganisms that cause food borne illnesses
5438.D3.5	Explain the purpose and uses of the Hazard Analysis Critical Control Pont (HACCP) food safety system
5438.D3.6	Apply proper procedures for receiving, storing, preparing, cooking, holding, cooling, reheating, and serving food, including the proper use of appropriate tools and equipment to ensure that the five risk factors identified by the CDC are addressed
5438.D3.7	Demonstrate procedures for cleaning and sanitizing tools and equipment
Domain	***Nutrition***
5438.D4.1	Students will connect nutrition principles and their effect on menu planning for a variety of dietary needs.
5438.D4.2	Integrate the Dietary Guidelines, Recommended Dietary Allowances (RDAs) and other governmental resources to plan meals and determine portion sizes
5438.D4.3	Utilize nutrition labels and other information on food packaging to make decisions about ingredients used in food preparation
5438.D4.4	Adapt recipes for increased nutritional value and to accommodate special dietary needs
Domain	***Culinary Skills***
5438.D5.1	Students will apply concepts of basic culinary skills to successfully plan and prepare quality food products.
5438.D5.2	Investigate components, functions, and purposes of standardized recipes
5438.D5.3	Apply concepts of the recipe conversion factor for use in a variety of standardized recipes

5438.D5.4	Demonstrate correct use of common measurement tools, including scales, portioning scoops, and other tools used in the food service industry when weighing, measuring, and portioning food
5438.D5.5	Apply concepts of knife safety when demonstrating knife skill techniques, including precision cuts
5438.D5.6	Demonstrate effective *mise en place* to accomplish efficient preparation of food products
5438.D5.7	Demonstrate a variety of industry-accepted cooking methods, including roasting and baking, broiling, grilling, griddling, sautéing, frying, deep frying, braising, stewing, poaching, and steaming
5438.D5.8	Demonstrate industry-accepted food preparation methods and basic techniques when preparing stocks, soups, sauces, breakfast foods, sandwiches, canapés, appetizers, salads, dressings, and marinades
5438.D5.9	Investigate regional and ethnic influences when selecting and preparing a variety of cultural menus
5438.D5.10	Create professional plating utilizing garnishing and food presentation techniques
Domain	***Hospitality Management Skills***
5438.D6.1	Students will examine basic hospitality management skills.
5438.D6.2	Compare and contrast skills needed in the multiple avenues of the hospitality industry
5438.D6.3	Analyze the hospitality industry's impact on local economies
5438.D6.4	List examples of the kinds of businesses that make up the hospitality industry
5438.D6.5	Apply concepts of dollar value of inventory, food costs, and profit margins needed in hospitality management.

Advanced Career & Technical Education, College Credit: Hospitality, Events, and Tourism	
Career Cluster	Hospitality, Events, & Tourism
Program of Study	
NLPS Sequence	
Course Code	6120
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited postsecondary institution through an adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint program of study involving a postsecondary partnership.*
Prerequisite(s)/ Corequisite(s)	None Recommended Prerequisites: CTE courses that would help prepare the student for success in this area.

Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Appropriate Vocational License ● Vocational Home Economics K-12
Rules 46-47	● Appropriate Vocational License ● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12
Rules 2002	● Appropriate CTE License ● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Human and Social Services
REPA/REPA 3	● Appropriate CTE License ● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Human and Social Services
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Hospitality and Human Services: Special Topics	
Career Cluster	Hospitality, Events, & Tourism
Program of Study	
NLPS Sequence	
Course Code	6152
Course Description	*Hospitality and Human Services: Special Topics is an extended learning experience designed to address the advancement and specialization of careers within the career cluster through the provision of a specialized course for a specific workforce need in the school's region. The learning experience is at a qualified site, and is designed to give the student the opportunity to learn and practice technical skills; while working under the direction of the appropriately licensed professional. Throughout the course, students will focus on learning about employment opportunities and obtaining the knowledge, skills and attitudes essential for success in specific occupations. Course standards and curriculum must be tailored to the specific profession, preparing students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. Participation in a related CTSO encourages the development of leadership, communication and career related skills, and opportunities for community service.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, May be offered for successive semesters up to 12 credits
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE Funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Appropriate Vocational License ● Vocational Home Economics K-12
Rules 46-47	● Appropriate Vocational License ● Consumer Homemaking Education 9-12 ● Occupational Education (FACS) 9-12
Rules 2002	● Appropriate CTE License ● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Human and Social Services
REPA/REPA 3	● Appropriate CTE License ● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Human and Social Services

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	

Hospitality, Events, & Tourism Culinary Arts – Baking and Pastry							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7173	Principles of Culinary and Hospitality	7171	Nutrition	7169	Culinary Arts	7233	Culinary Capstone
						7235	Pastry Capstone

Principles of Culinary and Hospitality		
Career Cluster	Hospitality, Events, & Tourism	
Program of Study	Culinary Arts – Baking and Pastry, Hospitality Management, Nutrition Science	
NLPS Sequence	A	
Course Code	7173	
Course Description	*Principles of Culinary and Hospitality is designed to develop an understanding of the hospitality industry and career opportunities, and responsibilities in the food service and lodging industry. Introduces procedures for decision making which affects operation management, products, labor, and revenue. Additionally, students will learn the fundamentals of food preparation, basic principles of sanitation, service procedures, and safety practices in the food service industry including proper operation techniques for equipment.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Food Production & Management 9-12 ● Consumer Homemaking Education 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Culinary Arts & Food Service Management Occupations ● Workplace Specialist: Food Science	

REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Culinary Arts 9-12 ● Workplace Specialist: Hospitality Management 9-12 ● Workplace Specialist: Food Science 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HOSP 101: Sanitiation-Safety, HOSP 102: Basic Food Theory and Skills
VU Course Alignment	REST 120: Food Service Sanitation, CULN 110: Quantity Food Production
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Culinarian (12.0509); CT Dietary Management (19.0505); TC Hospitality Administration: Culinary (52.0299); TC Hospitality Administration: Hospitality Management (52.0299) VU - CG Culinary Arts, Restaurant and Food Services, and Hotel Management (12.0504); A.S. Culinary Arts (12.0503); A.S. Restaurant and Food Service Mgmt (12.0504)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Basic Food Theory and Skills***
7173.D1.1	Define hospitality and the philosophy of the hospitality industry.
7173.D1.2	Trace the growth and development of the hospitality and tourism industry.
7173.D1.3	Describe the various cuisines and contributions of leading culinarians.
7173.D1.4	Identify professional organizations within the field; explain purposes and benefits.
7173.D1.5	Outline the organization, structure, and functional areas in various hospitality organizations as a perspective for later courses.
7173.D1.6	Discuss/evaluate industry trends as they relate to career opportunities and the future of the industry.
7173.D1.7	Discuss and evaluate industry trade periodicals and social media
7173.D1.8	Demonstrate how to read and follow a standard recipe.
7173.D1.9	Demonstrate knife skills, hand tools, and equipment operation, emphasizing proper safety and sanitation.
7173.D1.10	Identify and use utensils, pots and pans.
7173.D1.11	Utilize weights and measures to demonstrate proper scaling and measurement techniques.
7173.D1.12	Define, describe and demonstrate basic cooking methods to include boiling, steaming, poaching, roasting, pan frying, deep fat frying, sautéing, broiling, grilling, braising and sous vide.
7173.D1.13	Demonstrate process of recipe yield adjustment.
7173.D1.14	Identify and use herbs, spices, oils and vinegars.
7173.D1.15	Identify and prepare fruits, vegetables, starches and farinaceous items.

Domain	***Safety and Sanitation***
7173.D2.1	Identify the critical control points during all food handling processes as a method for minimizing the risk of food borne illness (HACCP system).
7173.D2.2	Identify microorganisms, which are related to food spoilage and food borne illnesses; describe their requirements and methods for growth.
7173.D2.3	Recognize symptoms common to food borne illnesses and how these illnesses can be prevented.
7173.D2.4	Demonstrate knowledge of good personal hygiene and health habits.
7173.D2.5	Develop acceptable procedures when preparing potentially hazardous foods to include time/temperature principles.
7173.D2.6	Differentiate the major reasons for and recognize signs of food spoilage.
7173.D2.7	Describe the requirements for proper receiving and storage of both raw and prepared foods.
7173.D2.8	Recognize sanitary and safety design and construction features of food production equipment and facilities. (i.e., NSF, UL, OSHA, ADA, etc.).
7173.D2.9	Differentiate current types of cleaners and sanitizers and their proper use.
7173.D2.10	Review Material Safety Data Sheets (MSDS) and understand their requirements in handling hazardous materials. Discuss right-to-know laws.
7173.D2.11	Develop cleaning and sanitizing schedule and procedures for equipment and facilities.
7173.D2.12	Identify proper methods of waste disposal and recycling.
7173.D2.13	Differentiate signs of pest infestation and conclude appropriate measures for insects, rodents, and pest eradication appropriate measures for insects, rodents, and pest control eradication.
7173.D2.14	Understand steps of a sanitation self-inspection and identify modification necessary for compliance with standards.
7173.D2.15	Differentiate appropriate types and use of fire extinguishers used in the food service area.
7173.D2.16	Recall laws and rules of the regulatory agencies governing sanitation and safety in foodservice operation.
7173.D2.17	Demonstrate knowledge of how blood-borne pathogens can spread.
7173.D2.18	Demonstrate knowledge of basic first-aid techniques and CPR.
Domain	***Career Navigation***
7173.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7173.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7173.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7173.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7173.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7173.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7173.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.

7173.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7173.D5.1	Demonstrate computer literacy skills and basic computer functions.
7173.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7173.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7173.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Nutrition		
Career Cluster	Hospitality, Events, & Tourism	
Program of Study	Culinary Arts – Baking and Pastry	
NLPS Sequence	B	
Course Code	7171	
Course Description	*Nutrition students will learn the characteristics, functions and food sources of the major nutrient groups and how to maximize nutrient retention in food preparation and storage. Students will be made aware of nutrient needs throughout the life cycle and to apply those principles to menu planning and food preparation. This course will engage students in hands-on learning of nutritional concepts such as preparing nutrient dense meals or examining nutritional needs of student athletes*	
Prerequisite(s)/ Corequisite(s)	Principles of Culinary and Hospitality	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Food Production & Management 9-12 ● Consumer Homemaking Education 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Culinary Arts & Food Service Management Occupations ● Workplace Specialist: Food Science	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12	

	● Workplace Specialist: Culinary Arts 9-12 ● Workplace Specialist: Hospitality Management 9-12 ● Workplace Specialist: Food Science 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HOSP 104: Nutrition
VU Course Alignment	FACS 206: Fundamentals of Nutrition*
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Culinarian (12.0509); CT Dietary Management (19.0505); TC Hospitality Administration: Culinary (52.0299) TC Hospitality Administration: Hospitality Management (52.0299)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Nutrition***
7171.D1.1	List the six food groups in the current USDA food guide, MyPlate, and the recommended daily servings from each. List the major nutrients contributed by each of the food groups.
7171.D1.2	Discuss the current Dietary Guidelines for Americans and adapt recipes accordingly.
7171.D1.3	Evaluate diets in terms of the Recommended Dietary Allowances.
7171.D1.4	Describe the characteristics, functions, and best sources of the major nutrients.
7171.D1.5	List the primary functions and best sources of each of the major vitamins and minerals.
7171.D1.6	Describe the process of human digestion.
7171.D1.7	Discuss energy balance in terms of calories consumed and daily energy expenditure.
7171.D1.8	Discuss healthy cooking techniques and menu planning.
7171.D1.9	Identify common food allergies and determine appropriate substitutions.
7171.D1.10	Discuss contemporary nutritional issues such as vegetarianism, heart healthy menus and religious food preferences.
7171.D2.1	Understand careers related to nutrition and the health industry.

Culinary Arts	
Career Cluster	Hospitality, Events, & Tourism
Program of Study	Culinary Arts – Baking and Pastry
NLPS Sequence	C

Course Code	7169	
Course Description	*Culinary Arts teaches students how to prepare the four major stocks, the five mother sauces (in addition to smaller sauces) and various soups. Additional emphasis is placed on the further development of the classical cooking methods. This course will also present the fundamentals of baking science including terminology, ingredients, weights and measures, and proper use and care of equipment. Students will produce yeast goods, pies, cakes, cookies, and quick breads.*	
Prerequisite(s)/ Corequisite(s)	Principles of Culinary and Hospitality	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Vocational Specialist I, II or III: Food Production & Management 9-12 ● Consumer Homemaking Education 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Culinary Arts & Food Service Management Occupations ● Workplace Specialist: Food Science	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Culinary Arts 9-12 ● Workplace Specialist: Hospitality Management 9-12 ● Workplace Specialist: Food Science 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HOSP 103: Soups, Stocks, and Sauces; HOSP 105: Intro to Baking	
VU Course Alignment	CULN 161: Introduction to Baking*	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC – CT Culinarian (12.0509), TC Hospitality Administration: Culinary (52.0999)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Soups, Stocks and Sauces***
7169.D1.1	Demonstrate knife skills, hand tool and equipment operation, emphasizing proper safety and sanitation.
7169.D1.2	Identify and prepare various stocks, soups and sauces.
7169.D1.3	Identify and select pre-made soup bases.
7169.D1.4	Gain a working knowledge of the use of bases and flavorings for the preparation of various sauces and gravies.
7169.D1.5	Demonstrate the use of bases in stock preparation.
7169.D1.6	Describe the basic types of stocks.
7169.D1.7	List ingredients and seasonings used in stock preparation.
7169.D1.8	Identify and select stocks.
7169.D1.9	Demonstrate the preparation and uses of glazes prepared from stocks.
7169.D1.10	Identify, select and prepare thickening agents.
7169.D1.11	Identify the seasoning forms.
7169.D1.12	Identify and select bones for stocks.
7169.D1.13	Identify and select ingredients for soups.
7169.D1.14	Outline the major classifications and uses of sauces.
7169.D1.15	Demonstrate food presentation techniques.
7169.D1.16	Discuss and demonstrate cooking techniques and storage principles for maximum retention of nutrients.
Domain	***Baking and Pastries***
7169.D2.1	Define baking terms.
7169.D2.2	Identify equipment and utensils used in baking and discuss proper use and care.
7169.D2.3	Demonstrate proper selection of equipment and utensils for specific application.
7169.D2.4	Identify ingredients used in baking.
7169.D2.5	Demonstrate proper scaling and measurement techniques.
7169.D2.6	Apply basic math skills to recipe conversions.
7169.D2.7	Describe properties and list function of various ingredients.
7169.D2.8	Prepare crusty, soft and specialty yeast products; observe reactions.
7169.D2.9	Prepare quick breads.
7169.D2.10	Produce a variety of types of pies and tarts.
7169.D2.11	Produce a variety of types of cookies.
7169.D2.12	Prepare laminated doughs such as puff pastry, croissant, and Danish pastry doughs.
7169.D2.13	Prepare creams, custards, puddings, and related sauces.
7169.D2.14	Discuss the application of mixes and other labor-saving products.
7169.D2.15	Discuss nutritional concerns as they apply to baking, including recipe modifications.
7169.D2.16	Prepare fritters, cobblers and crisps.
7169.D2.17	Prepare a variety of fillings and toppings for pastries and baked goods.

Baking and Pastry Capstone		
Career Cluster	Hospitality, Events, & Tourism	
Program of Study	Culinary Arts – Baking and Pastry	
NLPS Sequence	D	
Course Code	7235	
Course Description	*The objective of this course is to help students understand the science of baking and the different reactions that take place based on the ingredients, temperatures, and equipment in relation to the final product. The course requires students to produce and finish a variety of cakes. The course emphasizes application techniques, color coordination, and the flavor and texture of fillings. Students will practice the techniques of basic cake decorating.This course will also address classical French and European desserts, including the preparation of goods such as Napoleons, Gateau St. Honoré, petit fours and petit fours sec, ganaches, pastry creams and fillings, sauces, flans and tarts, and European sponges. The course also includes instruction in tempering of chocolates, molding, and chocolate plastique, preparation of truffles, pastillage and marzipan, short doughs, and meringues. The student will be instructed in the latest preparation methods, innovative ideas for impressive plate presentations, and techniques that utilize specialized equipment and tools to make high-tech, novel creations*	
Prerequisite(s)/ Corequisite(s)	Principles of Culinary and Hospitality; Nutrition; Culinary Arts	
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Vocational Specialist I, II or III: Food Production & Management 9-12 ● Consumer Homemaking Education 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Culinary Arts & Food Service Management Occupations ● Workplace Specialist: Food Science	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Culinary Arts 9-12 ● Workplace Specialist: Hospitality Management 9-12 ● Workplace Specialist: Food Science 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	HOSP 108: Human Relations Management; HOSP 113: Baking Science; HOSP 111: Yeast Breads; HOSP 208: Cakes, Icings, Fillings; HOSP 209: Advanced Decorating and Candies; HOSP 213: Classical Pastries and Chocolates
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Culinarian (12.0509), TC Hospitality Administration: Culinary (52.0999)
Liberal Arts/Sciences Requirements	
Promoted Certifications	Certified Fundamental Pastry Cook

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Human Relations Management***
7235.D1.1	Describe the process of management through effective communication skills.
7235.D1.2	Summarize leadership styles and analyze when each is most appropriate.
7235.D1.3	Outline the supervisor's role in ethical decision-making, problem solving, and delegation of duties.
7235.D1.4	Explain the role of job descriptions and specifications and develop written examples.
7235.D1.5	Perform mock interviews; analyze results.
7235.D1.6	Describe procedures of new employee orientation.
7235.D1.7	Compare training methods; construct an effective employee-training program to include follow-up training and cross training.
7235.D1.8	Analyze types and methods of employee evaluation.
7235.D1.9	Describe necessity of change and ways of implementing change with the least employee resistance.
7235.D1.10	Evaluate methods of conflict resolution.
7235.D1.11	Identify reasons for disciplinary problems and discuss the supervisor's role in handling them.
7235.D1.12	Describe the procedure for terminating employees.
7235.D1.13	Analyze motivational techniques/problems; discuss procedures for attitudinal changes.
7235.D1.14	Analyze ways of dealing with stress in the workplace.
7235.D1.15	Discuss time management and other organizational management techniques.
Domain	***Cakes, Icing and Fillings***
7235.D2.1	Identify, select, and use and care for tools and equipment used in baking and decorating cakes.
7235.D2.2	Prepare and describe techniques used in mixing, panning, and baking cakes.
7235.D2.3	Produce a variety of cakes including butter, sponge, high ratio, and other cake variations.
7235.D2.4	Understand how to correct cake failures and defects.
7235.D2.5	Produce a variety of icings used in cake assembly and production.
7235.D2.6	Prepare a variety of fillings and toppings.
7235.D2.7	Construct classical and special occasion cakes, including layer cakes and sheet cakes.

7235.D2.8	Develop and utilize different decorating techniques.
7235.D2.9	Identify and assess practical approaches to marketing.
Domain	***Classical Pastries and Chocolates***
7235.D3.1	Utilize proper cake mixing methods to produce quality scratch baked cakes, icings and fillings for classical cake formulas.
7235.D3.2	Develop basic icing, piping, decorating and finishing skills for cakes.
7235.D3.3	Produce pastry dough for tart crusts.
7235.D3.4	Produce fillings for pastry tarts with finishing techniques for proper presentation.
7235.D3.5	Prepare Choux pastries.
7235.D3.6	Prepare the three basic meringue types.
7235.D3.7	Prepare a variety of dessert sauces.
7235.D3.8	Discuss the application of mixes and other value-added products.
7235.D3.9	Identify types of chocolate and demonstrate proper technique in tempering chocolate and use chocolate effectively for garnishes.
7235.D3.10	Demonstrate proper technique in cooking sugar and producing basic sugar works.
7235.D3.11	Prepare ice creams, sorbets and other frozen desserts.
7235.D3.12	Prepare hot and cold soufflés.
7235.D3.13	Produce and prepare marzipan figurines.
Domain	***Yeast Breads***
7235.D4.1	Demonstrate intermediate knowledge of baking terms, ingredients, equipment and utensils.
7235.D4.2	Apply basic math skill to recipe conversions.
7235.D4.3	Demonstrate proper scaling and measurement techniques.
7235.D4.4	Demonstrate proper selection of equipment and utensils for specific application.
7235.D4.5	Demonstrate basic knowledge and proficiency in the production of principle yeast bread products: lean yeast doughs, crusty European-style hearth/artisan breads (French bread varieties), sourdough bread, rich yeast doughs, soft-roll yeast doughs, sweet yeast doughs, laminated yeast doughs (croissant & Danish), specialty yeast doughs (Baba & Savarin, pizza dough, focaccia), and yeast biscuits.
Domain	***Baking Science***
7235.D5.1	Understand the nature of the combination of ingredients in baking formulas.
7235.D5.2	Understand the methods of mixing and its importance in baking.
7235.D5.3	Understand the importance of standardized formulas and the science of substitutions.
7235.D5.4	Utilize basic mathematics in formulas to ensure the consistency of products.
Domain	***Advanced Decorating Candies***
7235.D6.1	Demonstrate knowledge of the science and art of classical and contemporary candies and confectionary decorating.
7235.D6.2	Develop a concise workable recipe repertoire with format and logical categorization
7235.D6.3	Demonstrate proficiency in the production of candy products.
7235.D6.4	Demonstrate proficiency in decorating confections and other patisserie.
7235.D6.5	Produce and merchandise confections and other patisserie.

Culinary Arts Capstone		
Career Cluster	Hospitality, Events, & Tourism	
Program of Study	Culinary Arts – Baking and Pastry	
NLPS Sequence	D	
Course Code	7233	
Course Description	*This course covers the techniques and skills needed in breakfast cookery as well as insight into the pantry department. Various methods of preparation of eggs, pancakes, waffles and cereals will be discussed. Students will receive instruction in salad preparation, salad dressing, hot and cold sandwich preparation, garnishes and appetizers. This course also covers the necessary skills for proper recruiting, staffing, training, and management of employees at various levels. The course will help prepare the student for the transition from employee to supervisor. Additionally, it will help the student evaluate styles of leadership, and develop skills in human relations and personnel management.*	
Prerequisite(s)/ Corequisite(s)	Principles of Culinary and Hospitality; Nutrition; Culinary Arts	
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Vocational Specialist I, II or III: Food Production & Management 9-12 ● Consumer Homemaking Education 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Culinary Arts & Food Service Management Occupations ● Workplace Specialist: Food Science	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Culinary Arts 9-12 ● Workplace Specialist: Hospitality Management 9-12 ● Workplace Specialist: Food Science 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HOSP 106: Pantry and Breakfast; HOSP 108: Human Relations Management; HOSP 111: Yeast Breads; HOSP 113: Baking Science; HOSP 200: Meat and Seafood Fabrication; HOSP 207: Customer Service; HOSP 208: Cakes, Icing, Fillings; HOSP 209: Advanced Decorating and Candies; HOSP 213: Classical Pastries	

VU Course Alignment	VU-EC – CULN 215: Supervision of the Quantity Food Facility
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Culinarian (12.0509), TC Hospitality Administration: Culinary (52.0999) VU-EC – A.S. Culinary Arts (12.0503)
Liberal Arts/Sciences Requirements	
Promoted Certifications	Serv Safe – Food Manager; Certified Fundamentals Cook (CFC)

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Human Relations Management***
7233.D1.1	Describe the process of management through effective communication skills.
7233.D1.2	Summarize leadership styles and analyze when each is most appropriate.
7233.D1.3	Outline the supervisor's role in ethical decision-making, problem solving, and delegation of duties.
7233.D1.4	Explain the role of job descriptions and specifications and develop written examples.
7233.D1.5	Perform mock interviews; analyze results.
7233.D1.6	Describe procedures of new employee orientation.
7233.D1.7	Compare training methods; construct an effective employee-training program to include follow-up training and cross training.
7233.D1.8	Analyze types and methods of employee evaluation.
7233.D1.9	Describe necessity of change and ways of implementing change with the least employee resistance.
7233.D1.10	Evaluate methods of conflict resolution.
7233.D1.11	Identify reasons for disciplinary problems and discuss the supervisor's role in handling them.
7233.D1.12	Describe the procedure for terminating employees.
7233.D1.13	Analyze motivational techniques/problems; discuss procedures for attitudinal changes.
7233.D1.14	Analyze ways of dealing with stress in the workplace.
7233.D1.15	Discuss time management and other organizational management techniques.
Domain	***Pantry and Breakfast***
7233.D2.1	Prepare quick breads and muffins.
7233.D2.2	Prepare laminated doughs.
7233.D2.3	Prepare crepe and appropriate application.
7233.D2.4	Identify the preparation, presentation, and service of a variety of beverages, including coffee and tea.
7233.D2.5	Identify and use herbs, spices, oils and vinegars.
7233.D2.6	Identify and prepare various salads, dressings (emulsions), and marinades.
7233.D2.7	Identify and prepare hot and cold sandwiches.
7233.D2.8	Identify and prepare canapés and hot and cold hors d'oeuvres.
7233.D2.9	Identify and prepare breakfast meats, eggs, cereals, and batter products.
7233.D2.10	Demonstrate food presentation techniques.

7233.D2.11	Identify and prepare different fruits and vegetables.
7233.D2.12	Demonstrate skills illustrating short order cooking techniques.
7233.D2.13	Illustrate appropriate garnishing techniques.
7233.D2.14	Plan a la carte, cycle, ethnic, banquet and buffet menu.
7233.D2.15	Prepare a variety of basic hot soufflés.
Domain	***Meat and Seafood***
7233.D3.1	Demonstrate knife skills, hand tools and equipment operation.
7233.D3.2	Understand the importance of proper sanitation procedures used during and after the butchery process.
7233.D3.3	Identify and select knives to be used in the butchering of meats, poultry, fish and seafood (scimitar, boning knife – stiff and flexible, slicer, utility knife, meat handsaw, and meat cleaver).
7233.D3.4	Describe the composition and structure of meat, poultry, fish, and seafood; explain how it relates to protein selection and cooking methods.
7233.D3.5	Use the federal meat inspection and grading system to select and purchase meats, poultry, fish, and seafood.
7233.D3.6	Explain proper purchasing, receiving, aging, storage and handling of meats, poultry, fish, and seafood.
7233.D3.7	Identify the primal cuts of beef, lamb, veal, and pork and list the major fabricated cuts obtained from each of them.
7233.D3.8	Demonstrate the various market cuts used in selling fish and seafood
7233.D3.9	Describe a variety of techniques used in merchandising seafood.
7233.D3.10	Explain the significance of aging meats.
7233.D3.11	Select appropriate cooking methods for the most important meat cuts, based on the meat's tenderness and other characteristics.
7233.D3.12	Demonstrate food presentation techniques.
7233.D3.13	Wrap and store meats for maximum shelf life.
7233.D3.14	Tie meats – tie string to form a net around meats for roasting.
7233.D3.15	For poultry, explain the differences between "light meat" and "dark meat," and describe how these differences affect cooking.
7233.D3.16	Identify any domestic poultry item with reference to its kind, class and style.
7233.D3.17	Cut chickens into halves, quarters and pieces of eight.
7233.D3.18	Store poultry items properly.
7233.D3.19	Define the concept of the "food mile."
7233.D3.20	Discuss controlling the amount of food prepared to reduce waste; and what can be done with excess prepared food as an alternative to composting.
7233.D3.21	Identify a variety of protein products that can be purchased in your local area and describe how you would procure them.
7233.D3.22	Identify the pros and cons of purchasing locally produced (raised) proteins.
7233.D3.23	Explain the pros and cons of purchasing organic foods.
7233.D3.24	Research the different ways of raising sustainable proteins.
7233.D3.25	Define (10) terms used to describe "sustainable" foods (e.g., free range, organic, heritage, heirloom, rBGH-free, etc.)
7233.D3.26	Identify the pros and cons of purchasing locally.
7233.D3.27	Understand the concept of sustainable seafood, and list 10 fish that are on the red, yellow,

	and green lists.
7233.D3.28	Research the benefits and issues related to aquaculture and wild-caught fish, along with the different wild-caught fish methods.
7233.D3.29	List seafood that can be substituted for red-listed species, based on fish texture and flavor.
Domain	***Customer Service***
7233.D4.1	Demonstrate the general rules of table settings and service.
7233.D4.2	Demonstrate specific American, English, French and Russian service.
7233.D4.3	Discuss food delivery system such as banquets, buffets, and catering.
7233.D4.4	Describe the functions of dining service.
7233.D4.5	Discuss training procedures for processing guest checks.
7233.D4.6	Discuss procedures for processing guest checks.
7233.D4.7	Demonstrate and understanding of guest service and customer relations, including handling of difficult situations and accommodations for the disabled.
7233.D4.8	Explain interrelationships and workflow between dining room and kitchen operations.
7233.D4.9	Discuss sales techniques for service personnel, including menu knowledge and suggestive selling.
7233.D4.10	Evaluate the relationship of beverages to food.
7233.D4.11	Identify the preparation, presentation, and service of non-alcoholic and dealcoholized beverages to include coffees and teas.
7233.D4.12	Identify equipment and glassware used for beverage preparation and service.
7233.D4.13	Discuss opening and closing procedures of a beverage operation.
7233.D4.14	Explain procedures for implementing internal beverage controls.
7233.D4.15	Create menu item descriptions following established truth-in-menu guidelines.

Hospitality, Events, & Tourism Hospitality Management							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7173	Principles of Culinary and Hospitality	7171	Nutrition	7172	Hospitality Management	7237	Hospitality Management Capstone

Principles of Culinary and Hospitality		
Career Cluster	Hospitality, Events, & Tourism	
Program of Study	Culinary Arts – Baking and Pastry, Hospitality Management, Nutrition Science	
NLPS Sequence	A	
Course Code	7173	
Course Description	*Principles of Culinary and Hospitality is designed to develop an understanding of the hospitality industry and career opportunities, and responsibilities in the food service and lodging industry. Introduces procedures for decision making which affects operation management, products, labor, and revenue. Additionally, students will learn the fundamentals of food preparation, basic principles of sanitation, service procedures, and safety practices in the food service industry including proper operation techniques for equipment.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Food Production & Management 9-12 ● Consumer Homemaking Education 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Culinary Arts & Food Service Management Occupations ● Workplace Specialist: Food Science	

REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Culinary Arts 9-12 ● Workplace Specialist: Hospitality Management 9-12 ● Workplace Specialist: Food Science 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HOSP 101: Sanitiation-Safety; HOSP 102: Basic Food Theory and Skills
VU Course Alignment	REST 120: Food Service Sanitation ; CULN 110: Quantity Food Production
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Culinarian (12.0509); CT Dietary Management (19.0505); TC Hospitality Administration: Culinary (52.0299); TC Hospitality Administration: Hospitality Management (52.0299) VU – CG Culinary Arts, Restaurant and Food Services, and Hotel Management (12.0504); A.S. Culinary Arts (12.0503); A.S. Restaurant and Food Service Management (12.0504)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Basic Food Theory and Skills***
7173.D1.1	Define hospitality and the philosophy of the hospitality industry.
7173.D1.2	Trace the growth and development of the hospitality and tourism industry.
7173.D1.3	Describe the various cuisines and contributions of leading culinarians.
7173.D1.4	Identify professional organizations within the field; explain purposes and benefits.
7173.D1.5	Outline the organization, structure, and functional areas in various hospitality organizations as a perspective for later courses.
7173.D1.6	Discuss/evaluate industry trends as they relate to career opportunities and the future of the industry.
7173.D1.7	Discuss and evaluate industry trade periodicals and social media
7173.D1.8	Demonstrate how to read and follow a standard recipe.
7173.D1.9	Demonstrate knife skills, hand tools, and equipment operation, emphasizing proper safety and sanitation.
7173.D1.10	Identify and use utensils, pots and pans.
7173.D1.11	Utilize weights and measures to demonstrate proper scaling and measurement techniques.
7173.D1.12	Define, describe, and demonstrate basic cooking methods to include boiling, steaming, poaching, roasting, pan frying, deep fat frying, sautéing, broiling, grilling, braising and sous vide.
7173.D1.13	Demonstrate process of recipe yield adjustment.
7173.D1.14	Identify and use herbs, spices, oils and vinegars.
7173.D1.15	Identify and prepare fruits, vegetables, starches and farinaceous items.

Domain	***Safety and Sanitation***
7173.D2.1	Identify the critical control points during all food handling processes as a method for minimizing the risk of food borne illness (HACCP system).
7173.D2.2	Identify microorganisms, which are related to food spoilage and food borne illnesses; describe their requirements and methods for growth.
7173.D2.3	Recognize symptoms common to food borne illnesses and how these illnesses can be prevented.
7173.D2.4	Demonstrate knowledge of good personal hygiene and health habits.
7173.D2.5	Develop acceptable procedures when preparing potentially hazardous foods to include time/temperature principles.
7173.D2.6	Differentiate the major reasons for and recognize signs of food spoilage.
7173.D2.7	Describe the requirements for proper receiving and storage of both raw and prepared foods.
7173.D2.8	Recognize sanitary and safety design and construction features of food production equipment and facilities. (i.e., NSF, UL, OSHA, ADA, etc.).
7173.D2.9	Differentiate current types of cleaners and sanitizers and their proper use.
7173.D2.10	Review Material Safety Data Sheets (MSDS) and understand their requirements in handling hazardous materials. Discuss right-to-know laws.
7173.D2.11	Develop cleaning and sanitizing schedule and procedures for equipment and facilities.
7173.D2.12	Identify proper methods of waste disposal and recycling.
7173.D2.13	Differentiate signs of pest infestation and conclude appropriate measures for insects, rodents, and pest eradication appropriate measures for insects, rodents, and pest control eradication.
7173.D2.14	Understand steps of a sanitation self-inspection and identify modification necessary for compliance with standards.
7173.D2.15	Differentiate appropriate types and use of fire extinguishers used in the food service area.
7173.D2.16	Recall laws and rules of the regulatory agencies governing sanitation and safety in foodservice operation.
7173.D2.17	Demonstrate knowledge of how blood-borne pathogens can spread.
7173.D2.18	Demonstrate knowledge of basic first-aid techniques and CPR.
Domain	***Career Navigation***
7173.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7173.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7173.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7173.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7173.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7173.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7173.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional

	networking.
7173.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7173.D5.1	Demonstrate computer literacy skills and basic computer functions.
7173.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7173.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7173.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Nutrition		
Career Cluster	Hospitality, Events, & Tourism	
Program of Study	Hospitality Management	
NLPS Sequence	B	
Course Code	7171	
Course Description	*Nutrition students will learn the characteristics, functions and food sources of the major nutrient groups and how to maximize nutrient retention in food preparation and storage. Students will be made aware of nutrient needs throughout the life cycle and to apply those principles to menu planning and food preparation. This course will engage students in hands-on learning of nutritional concepts such as preparing nutrient dense meals or examining nutritional needs of student athletes*	
Prerequisite(s)/ Corequisite(s)	Principles of Culinary and Hospitality	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas Counts as a science credit*	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Food Production & Management 9-12 ● Consumer Homemaking Education 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Culinary Arts & Food Service Management Occupations ● Workplace Specialist: Food Science	

REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Culinary Arts 9-12 ● Workplace Specialist: Hospitality Management 9-12 ● Workplace Specialist: Food Science 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HOSP 104: Nutrition
VU Course Alignment	FACS 206: Fundamentals of Nutrition*
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Culinarian (12.0509); CT Dietary Management (19.0505); TC Hospitality Administration: Culinary (52.0299); TC Hospitality Administration: Hospitality Management (52.0299)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Nutrition***
7171.D1.1	List the six food groups in the current USDA food guide, MyPlate, and the recommended daily servings from each. List the major nutrients contributed by each of the food groups.
7171.D1.2	Discuss the current Dietary Guidelines for Americans and adapt recipes accordingly.
7171.D1.3	Evaluate diets in terms of the Recommended Dietary Allowances.
7171.D1.4	Describe the characteristics, functions and best sources of the major nutrients.
7171.D1.5	List the primary functions and best sources of each of the major vitamins and minerals.
7171.D1.6	Describe the process of human digestion.
7171.D1.7	Discuss energy balance in terms of calories consumed and daily energy expenditure.
7171.D1.8	Discuss healthy cooking techniques and menu planning.
7171.D1.9	Identify common food allergies and determine appropriate substitutions.
7171.D1.10	Discuss contemporary nutritional issues such as vegetarianism, heart healthy menus and religious food preferences.
7171.D2.1	Understand careers related to nutrition and the health industry.

Hospitality Management	
Career Cluster	Hospitality, Events, & Tourism
Program of Study	Hospitality Management
NLPS Sequence	C

Course Code	7172	
Course Description	*Hospitality Management prepares students for employment in the hospitality industry. It provides the foundations for study in higher education that leads to a full spectrum of hospitality careers. This is a broad-based course that introduces students to all segments of hospitality, what it includes, and career opportunities that are available; provides a survey of management functions, highlighting basic theories and facts; and exposes students to current trends and current events within the industry. Three major goals of this course are for students to be able to identify current trends in hotel and restaurant management, distinguish the difference between hospitality and tourism, and state differences in front of the house versus back of the house.*	
Prerequisite(s)/ Corequisite(s)	Principles of Culinary and Hospitality	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Food Production & Management 9-12 ● Consumer Homemaking Education 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Lodging Management ● Workplace Specialist: Culinary Arts & Food Service Management Occupations ● Workplace Specialist: Precision Food Production	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Hospitality Management 9-12 ● Workplace Specialist: Culinary Arts 9-12 ● Workplace Specialist: Precision Food Production 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HOSP 114: Intro to Hospitality; HOSP 171: Intro to Convention Management	
VU Course Alignment	REST 100: Introduction to Hospitality Management	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC – TC Hospitality Administration: Hospitality Management (52.0999) VU – CG Culinary Arts, Restaurant and Food Services, and Hotel Management (12.0504); A.S. Culinary Arts (12.0503); A.S. Restaurant and Food Service Management (12.0504)	

Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Hospitality Management***
7172.D1.1	Discuss different job placement techniques.
7172.D1.2	Discuss the function of service and its impact on hospitality operations.
7172.D1.3	Describe the management functions of planning, organizing, staffing, controlling, and leadership.
7172.D1.4	Discuss early contributors to the hospitality industry and their impact on management philosophy and leadership.
7172.D1.5	Evaluate various segments of the food service industry.
7172.D1.6	Discuss how supply, demand, labor, and competition affect the hospitality industry.
7172.D1.7	Identify major consumer concerns and how they impact the food service industry.
7172.D1.8	Identify and describe the principal types of lodging properties.
7172.D1.9	Discuss the major departments in a hotel and how they function.
7172.D1.10	Examine key features of hotels relating to competition.
7172.D1.11	Assess the impact tourism has on the economy.
7172.D1.12	Discuss destination mix activities.
7172.D1.13	Describe the various channels of distribution found in tourism.
7172.D1.14	Interact with guest speakers representing various hospitality industry segments.
Domain	
7172.D2.1	Appreciate how the hospitality management industry affects students
7172.D2.2	Understand how the hospitality management industry impacts others
7172.D2.3	Understand the basic demands of today's hospitality employees/managers
7172.D2.4	Appreciate the connectivity of hospitality departments
7172.D2.5	Understand fundamental hospitality terms
Domain	***Convention and Meeting Management***
7172.D3.1	Identify aspects of convention/meeting management.
7172.D3.2	Analyze the growth and coinciding changes that this industry has experienced and project trends for the industry.
7172.D3.3	Construct a basic framework for planning a meeting, convention, or exposition.
7172.D3.4	Demonstrate the skills necessary for interacting with various service providers involved in the industry.
7172.D3.5	Compare and contrast types of convention facilities.
7172.D3.6	Construct a space utilization plan.

Hospitality Management Capstone		
Career Cluster	Hospitality, Events, & Tourism	
Program of Study	Hospitality Management	
NLPS Sequence	D	
Course Code	7237	
Course Description	*This course presents the essentials of effective food and beverage control while establishing systems for sale values of food and beverages that are outlined. This course addresses the application of the four-step control process to the primary phases of foodservice operations: purchasing, receiving, storing, issuing and production. Labor costs and sales forecasting are analyzed. This course also provides an opportunity for Intermediate Hospitality students to acquire valuable field experience by working under the supervision of a Hospitality Manager. The students will keep a journal and prepare a report on their experiences at the end of the course.*	
Prerequisite(s)/ Corequisite(s)	Principles of Culinary and Hospitality; Nutrition; Hospitality Management	
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Vocational Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Food Production & Management 9-12 ● Consumer Homemaking Education 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Lodging Management ● Workplace Specialist: Culinary Arts & Food Service Management Occupations ● Workplace Specialist: Precision Food Production	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Hospitality Management 9-12 ● Workplace Specialist: Culinary Arts 9-12 ● Workplace Specialist: Precision Food Production 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HOSP 107: Hositality Sales and Marketing or HOSP 272: The Tourism System; HOSP 108: Human Relations Management; HOSP 201: Hospitality Purchusing and Cost Control; HOSP 173: Special Event Management; HOSP 280: Co-op/Intership	

VU Course Alignment	REST 155: Quantity Food Purchasing
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – TC Hospitality Administration: Hospitality Management (52.0999) VU – CG Culinary Arts, Restaurant and Food Services, and Hotel Management (12.0504); A.S. Culinary Arts (12.0503); A.S. Restaurant and Food Service Management (12.0504)
Liberal Arts/Sciences Requirements	
Promoted Certifications	Serv Safe – Food Manager

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Human Relations Management***
7237.D1.1	Describe the process of management through effective communication skills.
7237.D1.2	Summarize leadership styles and analyze when each is most appropriate.
7237.D1.3	Outline the supervisor's role in ethical decision-making, problem solving, and delegation of duties.
7237.D1.4	Explain the role of job descriptions and specifications and develop written examples.
7237.D1.5	Perform mock interviews; analyze results.
7237.D1.6	Describe procedures of new employee orientation.
7237.D1.7	Compare training methods; construct an effective employee-training program to include follow-up training and cross training.
7237.D1.8	Analyze types and methods of employee evaluation.
7237.D1.9	Describe necessity of change and ways of implementing change with the least employee resistance.
7237.D1.10	Evaluate methods of conflict resolution.
7237.D1.11	Identify reasons for disciplinary problems and discuss the supervisor's role in handling them.
7237.D1.12	Describe the procedure for terminating employees.
7237.D1.13	Analyze motivational techniques/problems; discuss procedures for attitudinal changes.
7237.D1.14	Analyze ways of dealing with stress in the workplace.
7237.D1.15	Discuss time management and other organizational management techniques.
Domain	***Hospitality Purchasing and Control***
7237.D2.1	Discuss the flow of goods in a foodservice operation.
7237.D2.2	Describe the various formal and informal purchasing methods. (i.e., bid, phone, etc.)
7237.D2.3	Research and analyze market fluctuations and product cost.
7237.D2.4	Discuss legal and ethical considerations of purchasing.
7237.D2.5	Explain regulations for inspecting and grading of meats, poultry, seafood, eggs, dairy products, fruits and vegetables. Explain quality and yield grades as directed by the National Association of Meat Purveyors (NAMP) and the International Association of Meat Purveyors (INAMP) specifications for meats.
7237.D2.6	Write a bid specification.
7237.D2.7	Explain proper receiving and storage of food and non-food items, comparing them to product

	specifications.
7237.D2.8	Conduct yield and quality tests of canned, fresh, frozen, refrigerated, and staple goods.
7237.D2.9	Analyze the product costs and labor costs of prefabricated products and product produced on-premises.
7237.D2.10	Discuss inventory, rotation of stock, issuing, and current computerized systems for purchasing and inventory control.
7237.D2.11	Create sales forecasts.
7237.D2.12	Create labor schedules.
7237.D2.13	Calculate food, beverage and cost percentages, labor costs and percentages and other related costs.
7237.D2.14	Demonstrate process of recipe yield adjustment.
7237.D2.15	Demonstrate the process of recipe costing.
7237.D2.16	Determine selling price of menu items.
7237.D2.17	Identify environmentally friendly cleaning products and what common chemicals they can replace. Identify and compare costs.
7237.D2.18	Research/identify the benefits of using fiber textiles, including fiber textiles made from other recycled materials (e.g., carpet, clothing, seat covers, towels, napkins, curtains, etc.)
7237.D2.19	Identify regularly purchased products that could be replaced with recyclable, reusable or biodegradable items.
7237.D2.20	Identify local purchasing sources for produce and fruits.
7237.D2.21	Identify seasonally specific products. Discuss the pros and cons of menuing seasonal products.
7237.D2.22	Identify the benefits and challenges of stabling a facility garden to provide produce and herbs for your kitchen,
7237.D2.23	Compare the price of non-local to local food.
7237.D2.24	Identify local source(s) for recycling fats, oils, and grease.
7237.D2.25	Discuss the financial implications of recycling fats, oils, and grease from a restaurant's perspective,
7237.D2.26	Identify items that contain batteries that should be recycled.
7237.D2.27	Determine/research the cost benefit of recycling cardboard or another item.
7237.D2.28	Identify one organization in your area that will recycle glass.
7237.D2.29	List the post-consumer paper content in the paper products being used throughout the facility.
7237.D2.30	Research how alternatives to paper towels compare in terms of sustainability.
Domain	***Special Event Management***
7237.D3.1	Identify the historic roots of celebration.
7237.D3.2	Recognize the demographic changes affecting global event management growth.
7237.D3.3	Identify new and emerging career opportunities and industry certifications in event management.
7237.D3.4	Outline the stages of modern event management.
7237.D3.5	Identify key sources of information for planning.
7237.D3.6	Design and develop a strategic event and theme while managing a timeline and production schedule.
7237.D3.7	Develop policies, procedures and practices expected of event staff and volunteers.
7237.D3.8	Develop an event budget, correctly forecasting event revenue and expenses and report post-event financial results.

7237.D3.9	Identify communication styles and develop leadership and problem-solving abilities.
7237.D3.10	Conduct an event site inspection.
7237.D3.11	Recognize the importance of working effectively with third party suppliers and vendors.
7237.D3.12	Identify the five Ps in event management and successful sponsorship and advertising campaigns.
7237.D3.13	Explain how to comply with standard event regulations and evaluate legal event documents.
7237.D3.14	Demonstrate ability to use emerging technology within the event industry.
7237.D3.15	Describe opportunities available to advance an event management career.
Domain	***Hospitality Sales and Marketing***
7237.D4.1	Distinguish marketing from sales and identify trends that affect marketing and sales in the hospitality industry.
7237.D4.2	Identify and describe the key elements of a marketing plan.
7237.D4.3	Summarize the duties and responsibilities of positions typically found in a hotel marketing and sales office.
7237.D4.4	Describe the key components of a presentation sales call.
7237.D4.5	Explain the basics of effective telephone communication and describe various types of outgoing and incoming telephone calls related to the marketing and sales function.
7237.D4.6	Describe internal marketing and sales in a hospitality business environment.
7237.D4.7	Explain the role of advertising, public relations, and publicity in reaching prospective guests.
7237.D4.8	Summarize how hospitality properties are meeting the needs of business travelers.
7237.D4.9	Explain how hospitality properties are meeting the needs of leisure travelers.
7237.D4.10	Describe travel agencies and the travelers they serve.
7237.D4.11	Summarize how hotels market and sell to meeting planners.
7237.D4.12	Identify considerations for marketing hospitality products and services to international travelers and other special segments such as honeymooners, sports teams, and government travelers.
7237.D4.13	Summarize trends affecting the food and beverage industry and describe positioning strategies and techniques for restaurants and lounges.
7237.D4.14	Explain how hotels market and sell catered events and meeting rooms.
Domain	***Quantity Food Purchasing***
7237.D5.1	Student will be able to select appropriate venders
7237.D5.2	Student will learn the procedures for, receiving, storage, and inventory control
7237.D5.3	Student will be aware of techniques of specification and bid purchasing
7237.D5.4	Student will learn economical use of product.
7237.D5.5	Student will learn how the menu is the foundation of the food service industry

Hospitality, Events, & Tourism Nutrition Science							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7173	Principles of Culinary and Hospitality	7171	Nutrition	7170	Nutrition Planning and Therapy	7239	Nutrition Science Capstone

Principles of Culinary and Hospitality		
Career Cluster	Hospitality, Events, & Tourism	
Program of Study	Culinary Arts – Baking and Pastry, Hospitality Management, Nutrition Science	
NLPS Sequence	A	
Course Code	7173	
Course Description	*Principles of Culinary and Hospitality is designed to develop an understanding of the hospitality industry and career opportunities, and responsibilities in the food service and lodging industry. Introduces procedures for decision making which affects operation management, products, labor, and revenue. Additionally, students will learn the fundamentals of food preparation, basic principles of sanitation, service procedures, and safety practices in the food service industry including proper operation techniques for equipment.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Food Production & Management 9-12 ● Consumer Homemaking Education 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Culinary Arts & Food Service Management Occupations ● Workplace Specialist: Food Science	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Culinary Arts 9-12	

	● Workplace Specialist: Hospitality Management 9-12 ● Workplace Specialist: Food Science 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HOSP 101: Sanitiation-Safety, HOSP 102: Basic Food Theory and Skills
VU Course Alignment	REST 120: Food Service Sanitation, CULN 110: Quantity Food Production
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Culinarian (12.0509); CT Dietary Management (19.0505); TC Hospitality Administration: Culinary (52.0299); TC Hospitality Administration: Hospitality Management (52.0299) VU – CG Culinary Arts, Restaurant and Food Services, and Hotel Management (12.0504); A.S. Culinary Arts (12.0503); A.S. Restaurant and Food Service Mgmt (12.0504)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Basic Food Theory and Skills***
7173.D1.1	Define hospitality and the philosophy of the hospitality industry.
7173.D1.2	Trace the growth and development of the hospitality and tourism industry.
7173.D1.3	Describe the various cuisines and contributions of leading culinarians.
7173.D1.4	Identify professional organizations within the field; explain purposes and benefits.
7173.D1.5	Outline the organization, structure, and functional areas in various hospitality organizations as a perspective for later courses.
7173.D1.6	Discuss/evaluate industry trends as they relate to career opportunities and the future of the industry.
7173.D1.7	Discuss and evaluate industry trade periodicals and social media
7173.D1.8	Demonstrate how to read and follow a standard recipe.
7173.D1.9	Demonstrate knife skills, hand tools, and equipment operation, emphasizing proper safety and sanitation.
7173.D1.10	Identify and use utensils, pots and pans.
7173.D1.11	Utilize weights and measures to demonstrate proper scaling and measurement techniques.
7173.D1.12	Define, describe and demonstrate basic cooking methods to include boiling, steaming, poaching, roasting, pan frying, deep fat frying, sautéing, broiling, grilling, braising and sous vide.
7173.D1.13	Demonstrate process of recipe yield adjustment.
7173.D1.14	Identify and use herbs, spices, oils and vinegars.
7173.D1.15	Identify and prepare fruits, vegetables, starches and farinaceous items.
Domain	***Safety and Sanitation***
7173.D2.1	Identify the critical control points during all food handling processes as a method for

	minimizing the risk of food borne illness (HACCP system).
7173.D2.2	Identify microorganisms, which are related to food spoilage and food borne illnesses; describe their requirements and methods for growth.
7173.D2.3	Recognize symptoms common to food borne illnesses and how these illnesses can be prevented.
7173.D2.4	Demonstrate knowledge of good personal hygiene and health habits.
7173.D2.5	Develop acceptable procedures when preparing potentially hazardous foods to include time/temperature principles.
7173.D2.6	Differentiate the major reasons for and recognize signs of food spoilage.
7173.D2.7	Describe the requirements for proper receiving and storage of both raw and prepared foods.
7173.D2.8	Recognize sanitary and safety design and construction features of food production equipment and facilities. (i.e., NSF, UL, OSHA, ADA, etc.).
7173.D2.9	Differentiate current types of cleaners and sanitizers and their proper use.
7173.D2.10	Review Material Safety Data Sheets (MSDS) and understand their requirements in handling hazardous materials. Discuss right-to-know laws.
7173.D2.11	Develop cleaning and sanitizing schedule and procedures for equipment and facilities.
7173.D2.12	Identify proper methods of waste disposal and recycling.
7173.D2.13	Differentiate signs of pest infestation and conclude appropriate measures for insects, rodents, and pest eradication appropriate measures for insects, rodents, and pest control eradication.
7173.D2.14	Understand steps of a sanitation self-inspection and identify modification necessary for compliance with standards.
7173.D2.15	Differentiate appropriate types and use of fire extinguishers used in the food service area.
7173.D2.16	Recall laws and rules of the regulatory agencies governing sanitation and safety in foodservice operation.
7173.D2.17	Demonstrate knowledge of how blood-borne pathogens can spread.
7173.D2.18	Demonstrate knowledge of basic first-aid techniques and CPR.
Domain	***Career Navigation***
7173.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7173.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7173.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7173.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7173.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7173.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7173.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7173.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***

7173.D5.1	Demonstrate computer literacy skills and basic computer functions.
7173.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7173.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7173.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Nutrition		
Career Cluster	Hospitality, Events, & Tourism	
Program of Study	Nutrition Science	
NLPS Sequence	B	
Course Code	7171	
Course Description	*Nutrition students will learn the characteristics, functions and food sources of the major nutrient groups and how to maximize nutrient retention in food preparation and storage. Students will be made aware of nutrient needs throughout the life cycle and to apply those principles to menu planning and food preparation. This course will engage students in hands-on learning of nutritional concepts such as preparing nutrient dense meals or examining nutritional needs of student athletes*	
Prerequisite(s)/ Corequisite(s)	Principles of Culinary and Hospitality	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas Counts as a science credit*	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12 ● Occupational Specialist I, II or III: Food Production & Management 9-12 ● Consumer Homemaking Education 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting ● Workplace Specialist: Culinary Arts & Food Service Management Occupations ● Workplace Specialist: Food Science	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Culinary Arts 9-12 ● Workplace Specialist: Hospitality Management 9-12	

	● Workplace Specialist: Food Science 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HOSP 104: Nutrition
VU Course Alignment	FACS 206: Fundamentals of Nutrition*
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Culinarian (12.0509); CT Dietary Management (19.0505); TC Hospitality Administration: Culinary (52.0299); TC Hospitality Administration: Hospitality Management (52.0299)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Nutrition***
7171.D1.1	List the six food groups in the current USDA food guide, MyPlate, and the recommended daily servings from each. List the major nutrients contributed by each of the food groups.
7171.D1.2	Discuss the current Dietary Guidelines for Americans and adapt recipes accordingly.
7171.D1.3	Evaluate diets in terms of the Recommended Dietary Allowances.
7171.D1.4	Describe the characteristics, functions, and best sources of the major nutrients.
7171.D1.5	List the primary functions and best sources of each of the major vitamins and minerals.
7171.D1.6	Describe the process of human digestion.
7171.D1.7	Discuss energy balance in terms of calories consumed and daily energy expenditure.
7171.D1.8	Discuss healthy cooking techniques and menu planning.
7171.D1.9	Identify common food allergies and determine appropriate substitutions.
7171.D1.10	Discuss contemporary nutritional issues such as vegetarianism, heart healthy menus and religious food preferences.
Domain	
7171.D2.1	Understand careers related to nutrition and the health industry.

Nutrition Planning and Therapy	
Career Cluster	Hospitality, Events, & Tourism
Program of Study	Nutrition Science
NLPS Sequence	C
Course Code	7170
Course	*This course presents the basic principles of nutrition; the role nutrients play in maintaining*

Description	*good health as well as their effect on certain disease states. Students will learn to modify diets to meet various nutritional needs and to plan menus using modified diet principles. This course teaches students to develop an in-depth understanding of the principles of diet therapy. Students will learn to assess patients' nutritional needs, develop care plans, and implement a delivery system. Students will also learn documentation skills required by Centers for Medicare and Medicaid Services (CMS).*	
Prerequisite(s)/ Corequisite(s)	Principles of Culinary and Hospitality; Nutrition	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas Fulfills a science requirement for all diploma types	
Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Vocational Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● Workplace Specialist: Nutrition Science 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HOSP 115: Diet Therapy; HLHS 123: Meal Planning in Healthcare	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC – CT Dietary Management (19.0505)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Diet Therapy***	
7170.D1.1	List the characteristics, functions and food sources of carbohydrate, protein, and fat.	
7170.D1.2	Describe the primary function and food source of each of the major vitamins and minerals.	
7170.D1.3	Trace the process of digestion in the human body.	

7170.D1.4	Determine energy requirements based upon basal metabolic rate and exercise expenditure.
7170.D1.5	Write diets modified in calories, carbohydrates, fats, minerals, protein, and texture.
7170.D1.6	Recognize the type of modified diet needed for specific patient needs.
7170.D1.7	Demonstrate ability to document nutritional care plans.
7170.D1.8	Understand various nutritional needs throughout the life cycle.
Domain	***Meal Planning in Healthcare***
7170.D2.1	Apply principles of nutrition therapy when preparing meals for clients with diabetes, cardiovascular disease, celiac disease, COPD, and Alzheimer's disease.
7170.D2.2	Identify methods to prevent food-borne illnesses, including how to store dry, refrigerated, and frozen foods.
7170.D2.3	Explain effective ways to clean and sanitize kitchen areas and equipment.
7170.D2.4	Identify food sources on MyPlate and MyPlate for Older Adults.
7170.D2.5	Use a Nutrition Facts Label to identify food choices appropriate for therapeutic diets.
7170.D2.6	Identify key practices for preparing a meal plan that is balanced in nutrition and is cost effective.
7170.D2.7	Demonstrate how to store and prepare meats, proteins, fruits, and vegetables for cooking and consumption.
7170.D2.8	Discuss management of food allergies
Domain	
7170.D3.1	Utilize nutritional information in care planning and evaluate the effectiveness of care plans.
7170.D3.2	Understand the Minimum Data Sets and Resident Assessment Protocols.
7170.D3.3	Work with an interdisciplinary healthcare team.
7170.D3.4	Recognize and understand drug and nutrient interaction.
7170.D3.5	Understand and comply with the policies and procedures developed by the Centers for Medicare and Medicaid Services (CMS).

Nutrition Science Capstone	
Career Cluster	Hospitality, Events, & Tourism
Program of Study	Nutrition Science
NLPS Sequence	D
Course Code	7239
Course Description	*This course offers practical experience in a health care facility monitored by a Registered Dietician in order to build specialized skills. This work-based experience provides an opportunity for students to transfer their academic preparation into actual work-based learning by acquiring "real world" skills and building ties with the healthcare community. Student must complete 150 hours of field experience. (Students should have a site in mind prior to registering for this course–coordinator will assist.)*
Prerequisite(s)/ Corequisite(s)	Principles of Culinary and Hospitality; Nutrition; Nutrition Planning and Therapy
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max
Counts Toward	Counts as a Directed Elective or Elective for all diplomas

Dual Credit Status	X (PLC/ CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Vocational Home Economics K-12	
Rules 46-47	● Occupational Education (FACS) 9-12	
Rules 2002	● CTE: Family & Consumer Sciences with high school setting	
REPA/REPA 3	● CTE: Family & Consumer Sciences 5-12 ● WS: Nutrition Science 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HOSP 116: Dietary Mgmt0 Supervision*; HOSP 117: Dietary Mgmt- Cost Control; HOSP 118: Resident Clinical Assessment and Documentatio; HOSP 278: Dietary Management Internship	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC – CT Dietary Management (19.0505)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Dietary Management and Supervision***
7239.D1.1	Explain management practices as they are used in foodservice operations.
7239.D1.2	Demonstrate leadership skills.
7239.D1.3	Understand the process of staffing, scheduling, and training of employees.
7239.D1.4	Explain the importance of effective communication skills within and outside the foodservice operation.
7239.D1.5	Practice accurate costing, budgeting, and inventory procedures.
7239.D1.6	Determine effective marketing techniques.
7239.D1.7	Implement cost effective financial procedures.
7239.D1.8	Learn the importance of professional development.
Domain	***Cost Controls***
7239.D2.1	Explain purchasing and receiving practices as they are used in foodservice operations.
7239.D2.2	Understand the terminology and practice of food production skills.

7239.D2.3	Identify equipment needs.
7239.D2.4	Supervise the production and service of food.
7239.D2.5	Write purchase specifications.
7239.D2.6	Write general and modified menus.
7239.D2.7	Implement cost effective procedures
Domain	***Resident Clinical Assessment and Documentation***
7239.D3.1	Understand and apply the principles of diet therapy.
7239.D3.2	Develop and implement care plans to meet nutritional goals.
7239.D3.3	Utilize nutritional information in care planning and evaluate the effectiveness of care plans.
7239.D3.4	Understand the Minimum Data Sets and Resident Assessment Protocols.
7239.D3.5	Work with an interdisciplinary health care team.
7239.D3.6	Recognize and understand drug and nutrient interaction.
7239.D3.7	Understand and comply with the policies and procedures developed by the Centers for Medicare and Medicaid Services (CMS).
Domain	***Dietary Management Internship***
7239.D4.1	Discuss and demonstrate how concepts and skills learned in the classroom apply to the health care environment in the field of patient dietary management.
7239.D4.2	Identify and apply requisite skills needed in the fulfillment of a job assignment.
7239.D4.3	Compare and contrast the student's expectations of the internship and actual experience derived.
7239.D4.4	Summarize and evaluate the knowledge, skills and experience gained on the internship to apply these to the next job obtained by the student.
7239.D4.5	Explain and demonstrate how to adapt to the work environment as appropriate.
7239.D4.6	Document 150 work hours in the field required before testing for the Dietary Management certification.
Domain	
7239.D5.1	List the benefits and nutritional components of regular physical activity.
7239.D5.2	State the basic ways in which to assess nutritional status and intervene effectively.
7239.D5.3	Discuss disease states and treatments related to nutritional health
7239.D5.4	Define a healthy body weight and explain methods used to assess body composition.
7239.D5.5	Explain the principles of weight management.
7239.D5.6	Recognize the importance of nutritional knowledge in a health care profession.

Marketing, Sales, & Entrepreneurship

Introduction to Entrepreneurship		
Career Cluster	Business Management; Financial Services; Marketing, Sales, & Entrepreneurship	
Program of Study		
NLPS Sequence	Introductory	
Course Code	5967	
Course Description	*Introduction to Entrepreneurship provides an overview of what it means to be an entrepreneur. Students will learn about starting and operating a business, marketing products and services, and how to find resources to help in the development of a new venture. This course is ideal for students interested in starting their own art gallery, salon, restaurant, etc.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 to 2 semester course, 1 credit per semester, 2 credits maximum	
Counts Toward		
Dual Credit Status		
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Introductory	
Bulletin 400	● Business Education 7- 12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
5967.D7.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
5967.D7.2	Explain the benefits and responsibilities of being a member of a CTSO.
5967.D7.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5967.D7.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
5967.D8.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
5967.D8.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster
5967.D8.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
5967.D8.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society
5967.D8.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest
5967.D8.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
5967.D8.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster
Domain	***Entrepreneurship***
5967.D1.1	Students create an understanding of entrepreneurship, its components, and impact on society.
5967.D1.2	Define entrepreneurship and entrepreneur
5967.D1.3	Identify the personal traits and behaviors of entrepreneurs
5967.D1.4	Analyze the historical role of entrepreneurship in the marketplace

5967.D1.5	Identify trends in entrepreneurship domestic and international
5967.D1.6	Construct an idea for a product/service to meet the need(s) of consumers using brain-storming and other idea-generation methods
5967.D1.7	Critique career opportunities in entrepreneurship, including entrepreneurship
5967.D1.8	Connect resources available which can help in the creation of an entrepreneurial venture
Domain	***Operations***
5967.D2.1	Students critique the methods of effectively operating a business including the use of technology to improve performance.
5967.D2.2	Justify the need for and use of procedures for developing and operating an entrepreneurship business
5967.D2.3	Compare concepts, strategies, and systems needed to communicate effectively with others
5967.D2.4	Define the role of technology in a business
5967.D2.5	Identify types of business risks and how to manage them
5967.D2.6	Evaluate the legal and ethical issues in human resource management
5967.D2.7	Appraise options for entrepreneurs to transfer ownership or dissolve a business
Domain	***Finance***
5967.D3.1	Students understand accounting and financial management related to entrepreneurship.
5967.D3.2	Investigate financing options available to entrepreneurs when starting a business.
5967.D3.3	Identify revenues, expenses, and profit
5967.D3.4	Differentiate overhead and operating expenses
5967.D3.5	Compare and contrast the functions of four types of financial statements
5967.D3.6	Distinguish between debt and equity financing
5967.D3.7	Explain concepts of financial risk management in an entrepreneurial venture
Domain	***Legal***
5967.D4.1	Students analyze the legal aspects of starting and operating a business.
5967.D4.2	Summarize legal current issues affecting entrepreneurs
5967.D4.3	Evaluate the different forms of business ownership and entry into the marketplace
5967.D4.4	Summarize laws that protect small businesses
5967.D4.5	Classify types of intellectual property and its role in entrepreneurship
5967.D4.6	Characterize the need for and impact of ethical business practices and social responsibility
Domain	***Marketing***
5967.D5.1	Students design a marketing campaign for a new venture using a variety of marketing techniques.
5967.D5.2	Identify tools used in determining target markets
5967.D5.3	Describe the elements of the four Ps of marketing as they pertain to develop an entrepreneurial venture
Domain	***Business Plan***
5967.D6.1	Students create a business plan which informs readers of their thought process during the

	creation of a new venture.
5967.D6.2	Summarize the purpose of and sections that make up a business plan
5967.D6.3	Identify resources, including professional service providers, that should be consulted during the development of a business plan

Marketing, Sales, & Entrepreneurship Entrepreneurship							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7154	Principles of Entrepreneurship	7147	Entrepreneurial Operations	7148	New Venture Development	7201	Small Business Operations Capstone

Principles of Entrepreneurship		
Career Cluster	Business Management, Marketing and Finance	
Program of Study	Entrepreneurship	
NLPS Sequence	A	
Course Code	7154	
Course Description	*Principles of Entrepreneurship focuses on students learning about their own strengths, character and skills and how their unique abilities can apply to entrepreneurship, as well as how an entrepreneurial mindset can serve them regardless of their career path. Students will learn about the local, regional and state resources and will begin to understand and apply the entrepreneurial process. The course helps students to identify and evaluate business ideas while learning the steps and competencies required to launch a successful new venture.The course helps students apply what they have learned from the content when they write a Personal Vision Statement, a Business Concept Statement, and an Elevator Pitch.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting	

	● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway ● Workplace Specialist: Entrepreneurship 9-12 ● CTE: Trade & Industrial: Entrepreneurship 5-12
POST-SECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	ENTR 100: Entrepreneurial Mindset, ENTR 200: Entrepreneurial Enterprise
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Entrepreneurship (52.0701), TC Entrepreneurship (52.0701)
Liberal Arts/Sciences Requirements	ITCC - IVYT 111: Student Success for University Transfer
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Entrepreneurial Mindset***
7154.D1.1	Identify entrepreneurship concepts
7154.D1.2	Validate problems, solutions, and business ideas
7154.D1.3	Identifying customer target sectors
7154.D1.4	Explore potential products or services
7154.D1.5	Identify and utilize resources in the local entrepreneurial ecosystem
7154.D1.6	Craft an effective Elevator Pitch and communicate 'Why' your business
7154.D1.7	Develop professional skills and networking skills
Domain	***Entrepreneurial Enterprise***
7154.D2.1	Create effective business models
7154.D2.2	Validate business ideas
7154.D2.3	Map the customer journey
7154.D2.4	Develop a networking plan
7154.D1.5	Craft a compelling pitch
7154.D2.6	Understand basic personal and business finance, including startup costs, 1st-year projections, business finance, unit revenue, unit profit, and cost of goods sold (COGS)
Domain	***Career Navigation***

7154.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7154.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7154.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7154.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7154.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7154.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7154.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7154.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7154.D5.1	Demonstrate computer literacy skills and basic computer functions.
7154.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7154.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7154.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Entrepreneurial Operations	
Career Cluster	Business Management, Marketing and Finance
Program of Study	Entrepreneurship
NLPS Sequence	B
Course Code	7147
Course Description	*Small Business Operations will focus on key marketing strategies particularly relevant to new ventures. Students will develop an understanding of marketing, advertising, social media, and branding. Upon successful completion of this course, the student should be able to identify and evaluate the various sources available for funding a new enterprise; demonstrate an understanding of financial terminology; read, prepare, and analyze basic financial statements; estimate capital requirements and risk, exit strategies; and prepare a budget for their business. In addition, the student should be able to explain the importance of working capital and cash management. The students should also be able to identify financing needs and prepare sales forecasts.*
Prerequisite(s)/	Principles of Entrepreneurship

Corequisite(s)		
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway ● Workplace Specialist: Entrepreneurship 9-12 ● CTE: Trade & Industrial: Entrepreneurship 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	ENTR 105: Entrepreneurial Lean Marketing, ENTR 205: Financial Foundations for Entrepreneurs	
VU Course Alignment	ENTR 221: Creating a Small Business	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Entrepreneurship (52.0701), TC Entrepreneurship (52.0701) VU - A.S. Business Management (52.0101)	
Liberal Arts/Sciences Requirements	ITCC - IVYT 111: Student Success for University Transfer	
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		

Competency #	Competency
Domain	***Entrepreneurial Lean Marketing***
7147.D1.1	Understand and implement lean marketing principles.
7147.D1.2	Conduct market analysis and customer segmentation.
7147.D1.3	Identify and validate Unique Selling Propositions (USP).
7147.D1.4	Implement cost-effective marketing strategies across multiple marketing channels.
7147.D1.5	Build and implement an effective marketing campaign.
7147.D1.6	Understand the importance of Customer Relationship Management (CRM).
Domain	***Financial Foundations for Entrepreneurs***
7147.D2.1	Evaluate tools and systems for financial management.
7147.D2.2	Identify sources of financing available to small businesses and explain the advantages and disadvantages of each.
7147.D2.3	Identify, discuss, and prepare the primary financial statements (pro forma balance sheet, income statement, cash flow statement, etc.) essential to a new venture.
7147.D2.4	Explain the importance and methods of cash management.
7147.D2.5	Prepare a break-even analysis and sales forecast.
7147.D2.6	Apply asset management principles and compare and contrast the different asset classes and their functions as wealth management tools.
7147.D2.7	Explain the difference between cash accounting versus accrual accounting and tax accounting versus financial accounting reporting.
7147.D2.8	Identify the calculations, collections, payments, and filing requirements for state sales and use tax.

New Venture Development	
Career Cluster	Business Management, Marketing and Finance
Program of Study	Entrepreneurship
NLPS Sequence	C
Course Code	7148
Course Description	*New Venture Development is targeted at students interested in creating and growing their own businesses. The course will focus on key marketing strategies particularly relevant for new ventures including the appropriate business structure and organization, developing plans and strategies for the entrepreneurial venture, financing strategies, exploring growth opportunities, and successfully managing scarce resources. Students will explore buy/sell/lease negotiations, insurance, logistics, and use of technology. By the end, students will be well-prepared to tackle the challenges of small business management and entrepreneurship.*
Prerequisite(s)/ Corequisite(s)	Principles of Entrepreneurship
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas

Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway ● Workplace Specialist: Entrepreneurship 9-12 ● CTE: Trade & Industrial: Entrepreneurship 5-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	ENTR 215: New Venture Development, ENTR 218: New Venture Launch	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Entrepreneurship (52.0701), TC Entrepreneurship (52.0701)	
Liberal Arts/Sciences Requirements	ITCC: IVYT 111 Student Success for University Transfer	
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***New Venture Development***	
7148.D1.1	Assess legal concepts for business ownership, including fundamentals of contract law, legal challenges, and when to seek legal counsel	

7148.D1.2	Determine the form of business structure needed, including partnerships, limited liability corporations, family-owned, and succession planning
7148.D1.3	Manage government laws and regulations as they relate to small businesses
7148.D1.4	Learn different types of leases and ways to purchase or lease property
7148.D1.5	Discuss variables for buy/lease negotiations, layout, and location
7148.D1.6	Compare insurance needs and options
Domain	***New Venture Launch***
7148.D2.1	Create a prototype/minimum viable product and test it.
7148.D2.2	Communicate business plans effectively to various audiences.
7148.D2.3	Participate in a pitch competition or business showcase.
7148.D2.4	Prepare for startup launch.

Small Business Operations Capstone		
Career Cluster	Financial Services; Marketing, Sales, & Entrepreneurship	
Program of Study	Entrepreneurship; Insurance; Marketing and Sales	
NLPS Sequence	D	
Course Code	7201	
Course Description	*The Business Management Capstone is an applied course, and students will be implementing the correct legal, business, human resources, operations, marketing and financial structures after de- risking their idea and launching their business.*	
Prerequisite(s)/ Corequisite(s)	Any CTE Business Concentrator Sequence except Business Administration	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X	
Additional Notes	Recommended Capstone course for Entrepreneurship, Insurance, and Marketing Programs of Study	
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9- 12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	

Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 105: Principles of Management, BUSN 201: Business Law, ACCT 101: Financial Accounting, ENTR 220: Small Business Operations
VU Course Alignment	MGMT 250: Introduction to Management
Four Yr. Course Alignment	
Postsecondary Credential	VU - A.S. Business Administration (52.0201); A.S. Business Management (52.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Management***
7201.D1.1	Define management, managers, and the basic management functions.
7201.D1.2	Evaluate classical, behavioral, quantitative, and contemporary management theories regarding process, motivation, and expected outcomes. Distinguish between the external, task, and internal environments of organizations.
7201.D1.3	Discuss social responsibility, the meaning of ethics in the business setting, and the social audit.
7201.D1.4	Assess the roles of goals and goal setting in the planning process and identify barriers that may interfere with goal setting.
7201.D1.5	Appraise the strategic planning process and the process of strategy implementation.
7201.D1.6	Structure and support the steps in the decision-making process.
7201.D1.7	Identify and describe the major purposes for and types of forecasting techniques.
7201.D1.8	Discuss the nature of work specialization, departmentalization, and scheduling within the scope of management.
7201.D1.9	Discuss how organizational activities are coordinated and describe the management of organizational conflict.
7201.D1.10	Appraise international business practices and evaluate against cultural and political values.

Domain	***Business Law***
7201.D2.1	Discuss state and federal judicial systems and jurisdictions.
7201.D2.2	Identify the sources of laws as applied to business.
7201.D2.3	Apply appropriate legal principles to contractual obligations.
7201.D2.4	Understand the parameters of the various business structures.
7201.D2.5	Apply the laws of agency and debt adjustment to factual situations.
7201.D2.6	Recognize the obligations and rights of parties to negotiate instruments.
7201.D2.7	Recognize the rights and obligations of parties as regards personal and real property.
7201.D2.8	Recognize the rights and obligations of the parties to sales and lease of goods contracts.
7201.D2.9	Apply the Uniform Commercial Code to sales contracts and differentiate common law and Uniform Commercial Code situations.
7201.D2.10	Understand the application of consumer protection laws.
7201.D2.11	Recognize the importance of both Federal and State employment laws to effective organizational leadership.
7201.D2.12	Understand the importance of protecting intellectual property rights.
Domain	***Accounting***
7201.D3.1	Recognize the meaning and function of accounting, its importance, and basic US accounting rules and the body most responsible for their development.
7201.D3.2	Use the accounting cycle, including analyzing and recording transactions and preparing basic financial statements in accordance with accrual accounting principles.
7201.D3.3	Account for buying and selling merchandise, including using LIFO, FIFO, and weighted average to assign values to cost of goods sold and ending inventory.
7201.D3.4	Recognize the purpose, advantages, disadvantages, and limitations of internal controls. Prepare a bank reconciliation.
7201.D3.5	Account for uncollectible accounts receivable using the allowance method.
7201.D3.6	Account for notes receivable, including interest accruals.
7201.D3.7	Account for notes payable, including interest accruals. Recognize acceptable accounting for basic payroll and other short-term liabilities.
7201.D3.8	Recognize the cost of a plant asset and use accepted method(s) to depreciate a plant asset. Account for the disposal of plant assets. Recognize acceptable accounting for other non-current assets.
7201.D3.9	Calculate the present value of bonds at issuance and account for borrowing by issuing bonds.
7201.D3.10	Account for issuing common and preferred stock, treasury stock transactions, and for dividends.
7201.D3.11	Prepare a multi-step income statement and a classified balance sheet. Given cash pieces, prepare a statement of cash flows
7201.D3.12	Analyze a set of financial statements for profitability and liquidity.
7201.D3.13	Communicate effectively both orally and in writing, using professional, business English.
Domain	***Small Business Operations***
7201.D4.1	Create a growth and development action plan for a launched business.
7201.D4.2	Apply asset management principles and compare and contrast the different asset classes and their functions as wealth management tools.
7201.D4.3	Examine the basic methods of business valuation
7201.D4.4	Explore strategies for effective human resource recruitment and management.

7201.D4.5	Evaluate strategies for financing a growing firm.
7201.D4.6	Apply the calculations, withholding requirements, payments, and filing requirements related to payroll taxes.
7201.D4.7	Assess which income tax returns apply to different business entities at the federal, state, and local levels and explain the information needed for each.
7201.D4.8	Build the organizational structure and personnel function related to the entrepreneurial firm.

Marketing, Sales, & Entrepreneurship Marketing and Sales							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
4562	Principles of Business Management	5914	Marketing Fundamentals	5918	Strategic Marketing	7201	Small Business Operations Capstone
				7145	Digital Marketing		

Principles of Business Management		
Career Cluster	Business Management; Financial Services; Marketing, Sales, & Entrepreneurship	
Program of Study	Accounting, Business Administration, Finance and Investment, Insurance, Marketing and Sales, Supply Chain and Logistics	
NLPS Sequence	A	
Course Code	4562	
Course Description	*Principles of Business Management examines business ownership, organization principles and problems, management, control facilities, administration, financial management, and development practices of business enterprises. This course will also emphasize the identification and practice of the appropriate use of technology to communicate and solve business problems and aid in decision making. Attention will be given to developing business communication, problem-solving, and decision-making skills using spreadsheets, word processing, data management, and presentation software.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12	

	● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTEpathway
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 101: Introduction to Business, OTEC 207: Integrated Microsoft Office Applications or OTEC 101: Introduction to Microcomputers
VU Course Alignment	MGMT 100: Introduction to Business, COMP 110: Introduction to Computer Concepts
Four Yr. Course Alignment	BSU – ISOM 125: Introduction to Business Computer Applications ISU - BUS 100: Introduction to Contemporary Business, BUS 180: Business Information Tools IUB - BUS X-100: Introduction to Business IUN/S/K/N - BUS W-100: Introduction to Business IUSB - BUS B-190: Introduction to Business PFW - BUS 10001: Principles of Business Administration PNW - BUSM 10100: Introduction to Business USI - MNGT 201: Survey of Management
Postsecondary Credential	ITCC - CT Business Administration, TC Business Administration (52.0201) VU - A.S. Business Administration (52.0201), A.S. Business Management (52.0101) IUB/K/N/S/SB – B.S. Business (52.0101) PFW – B.S. Business (52.0101)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 114: Student Success in Business, Humanities/ Social & Behavioral 3-4 hours
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Business***
4562.D1.1	Identify the social, legal, economic, and ethical challenges of the business environment.
4562.D1.2	Identify management and leadership functions, and the relationship to operations and supply chain management.
4562.D1.3	Relate the characteristics of organizational structures to legal forms of business ownership including small business and entrepreneurship.

4562.D1.4	Examine the principles of short- and long-range financial planning, as well as the role of the stock exchanges in the financial markets.
4562.D1.5	Analyze business issues and events related to strategic decision-making in an international and global context.
4562.D1.6	Describe the marketing mix/marketing concept and its relationship to purchasing, production, distribution, and quality.
4562.D1.7	Interpret the importance of communication and technology to the success of the organization.
4562.D1.8	List and describe the human resource functions in business.
4562.D1.9	Examine career opportunities in business.
Domain	***Business Software Applications***
4562.D2.1	Explain the purpose of information systems to support organizations and enhance productivity.
4562.D2.2	Explain the physical components and operation of microcomputers.
4562.D2.3	Use word processing, spreadsheet, database, and presentation applications to perform key business tasks.
4562.D2.4	Explain the difference between computer operating systems and user software programs.
4562.D2.5	Identify when to use appropriate features within a software application.
4562.D2.6	Utilize internet applications and “cloud” technologies in business situations.
4562.D2.7	Utilize collaboration technologies.
4562.D2.8	Explain security goals, response to threats, and safeguards.
4562.D2.9	Discuss issues related to the ethical use of information technology.
Domain	***Career Navigation***
4562.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
4562.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
4562.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
4562.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
4562.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
4562.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
4562.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
4562.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
4562.D5.1	Demonstrate computer literacy skills and basic computer functions.
4562.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.

4562.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
4562.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Marketing Fundamentals		
Career Cluster	Business Management; Marketing, Sales, & Entrepreneurship	
Program of Study	Marketing and Sales	
NLPS Sequence	B	
Course Code	5914	
Course Description	*Marketing Fundamentals provides a basic introduction to the scope and importance of marketing in the global economy. Course topics include the seven functions of marketing: promotion, channel management, pricing, product/service management, market planning, marketing information management, and professional selling skills. Emphasis is marketing content but will involve use of oral and written communications, mathematical applications, problem-solving, and critical thinking skills through the development of an integrated marketing plan and other projects.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist with specific experience in strategic marketing	
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist with specific experience in strategic marketing	
REPA/REPA 3	● Business 5-12 ● CTE: Marketing 5-12	

	● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist with specific experience in strategic marketing
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	MKTG 101: Principles of Marketing, MKTG 102: Principles of Selling
VU Course Alignment	MGMT 280: Introduction to Marketing
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Business Administration (52.0201), TC Business Administration (52.0201), Business Administration, A.S. (52.0201) VU - A.S. Business Administration (52.0201), A.S. Business Management (52.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Marketing***
5914.D1.1	Analyze the nature of marketing in a competitive market, and how it functions in domestic and global economies.
5914.D1.2	Describe the various environmental factors affecting marketing decisions.
5914.D1.3	Explain how mission, situational analysis, objectives, positioning, and product and market analysis affect planning, forecasting and overall marketing strategy.
5914.D1.4	Explain the process of marketing research and its influences on marketing strategy.
5914.D1.5	Apply market segmentation, describe its relationship to selecting a target market, and discuss its effect on the success of the marketing plan.
5914.D1.6	Explain the purchase decision process and influences that affect consumer behavior.
5914.D1.7	Discuss and explain how logistics, marketing channels, and supply chain management create utility.
5914.D1.8	Discuss pricing strategy as it relates to markets, segments, and profitability.
5914.D1.9	Explain the correlation between marketing metrics and customer relationship management in providing feedback to identify gaps in meeting marketing objectives.
5914.D1.10	Construct an integrated marketing plan.
Domain	***Selling***
5914.D2.1	Discuss the relationship between personal selling and the marketing concept/marketing mix.
5914.D2.2	List the characteristics of industrial buying behavior and consumer buying behavior.
5914.D2.3	List or state personal attributes and performance characteristics of successful salespersons.
5914.D2.4	Understand and utilize varieties of communication forms to adapt to the buyer/ seller relationship.

5914.D2.5	Describe the importance of knowledge of the company, the competition, and the product and its impact on selling activities.
5914.D2.6	List the stages of the selling process.
5914.D2.7	Discuss managerial concerns that affect salespersons' performance appraisals.
5914.D2.8	Develop and deliver a prepared tailored presentation.
Domain	***Promotions***
5914.D3.1	Explain the role of promotion as a marketing function
5914.D3.2	Compare and contrast the types of promotion
5914.D3.3	Identify the elements of the promotional mix
5914.D3.4	Describe the use of business ethics in promotion
5914.D3.5	Differentiate types of advertising media, both traditional and digital

Digital Marketing		
Career Cluster	Marketing, Sales, & Entrepreneurship	
Program of Study	Marketing and Sales	
NLPS Sequence	C	
Course Code	7145	
Course Description	*Digital Marketing provides an introduction to the world of e-commerce and digital marketing media. The course covers how to integrate digital media and e-commerce into organizational and marketing strategy. Students will explore e-commerce applications and the most popular digital marketing tactics and tools. Emphasizes familiarity with executing digital media, understanding the marketing objectives that digital media can help organizations achieve, and establishing and enhancing an organization's digital marketing presence.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management; Marketing Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Distributive Education 9-12	
Rules 46-47	● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist with specific experience in strategic marketing	
Rules 2002	● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting	

	● Workplace Specialist with specific experience in strategic marketing
REPA/REPA 3	● CTE: Marketing 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist with specific experience in strategic marketing
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	MKTG 252: Introduction to Digital Marketing, MKTG 257: Digital Marketing Management
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC – CT Business Adminstration (52.0201), TC Business Administration (52.0201), Business Administration, A.S. (52.0201)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Digital Marketing***
7145.D1.1	Identify the real-time informational value of digital media.
7145.D1.2	Execute digital marketing tactics in an integrated marketing strategy to facilitate organizational goals, including but not limited to an integrated digital marketing plan, differentiation, positioning, and branding.
7145.D1.3	Discuss the ethical and legal issues for digital marketing.
7145.D1.4	Select correct digital media channels for desired communication objectives.
7145.D1.5	Describe the most common digital media tactics (i.e., Website, Search Engine Marketing (SEM), Email, Social Media, Paid Ads, Blogs, etc.) and the effective use of each.
7145.D1.6	Identify how an integrated digital marketing plan can improve brand recognition, expand the customer base, generate loyalty, and build relationships.
7145.D1.7	Describe the impact of digital media in delivering the marketing mix to the target market.
7145.D1.8	Discuss methods for soliciting and utilizing Voice of Customer.
7145.D1.9	Create and maintain company blogs as a method to engage in interactive conversations with customers to maintain or enhance customer experience and engagement with your brand, building trust, credibility, and loyalty.
7145.D1.10	Use professional social networking applications for recruitment and B-to-B communication (i.e., industry discussion groups, company buzz, polls of network and target groups).
7145.D1.11	Discuss the role of mobile technology and location-based marketing tools to bring the Internet to point of sale and connect with customers where they are.
7145.D1.12	Create personalized online video marketing content and channels.

7145.D1.13	Develop familiarity with social media aggregators to manage various media efficiently and effectively.
7145.D1.14	Discuss digital media from a global marketing perspective.
7145.D1.15	Track effectiveness and return-on-investment (ROI) of digital marketing tactics using digital analytics tools.
Domain	***Digital Marketing Management***
7145.D2.1	Describe the impact of the internet and digital tools on marketing management.
7145.D2.2	Identify methods of employing digital marketing for demand generation.
7145.D2.3	Apply marketing concepts (i.e., 4P's, integrated marketing strategy, adopter categories, product life cycle, market segmentation, and decision-making process) to digital marketing.
7145.D2.4	Discuss the use of the Internet for primary and secondary marketing research.
7145.D2.5	Judge digital product strategies including differentiation, branding, and positioning.
7145.D2.6	Distinguish the factors putting downward pressure on online pricing and general pricing strategies for digital marketing.
7145.D2.7	Explain how the Internet has both shortened and lengthened distribution channels and changed channel leadership and power.
7145.D2.8	Compare the advantages and disadvantages of e-commerce.
7145.D2.9	Propose the implications of the Internet and digital media for sales promotion, advertising, personal selling, public relations, customer service, and relationship marketing.
7145.D2.10	Evaluate website effectiveness, plan a website, and measure return-on-investment (ROI) of a website.
7145.D2.11	Discuss the major ethical, legal, and security issues of digital marketing and e-commerce.
7145.D2.12	Describe global marketing environmental factors for digital marketing and e-commerce.
7145.D2.13	Examine the importance of tracking online user behavior and identify the latest digital tracking methods.
7145.D2.14	Integrate an organization's goals and values into an integrated digital organization by transforming the organizational culture, attitudes and proficiencies toward digital media.
7145.D2.15	Evaluate and explain the effectiveness and return-on-investment (ROI) of an integrated digital marketing strategy using digital analytics tools.

Strategic Marketing	
Career Cluster	Marketing, Sales, & Entrepreneurship
Program of Study	Marketing and Sales
NLPS Sequence	C
Course Code	5918
Course Description	*Strategic Marketing builds upon the foundations of marketing and applies the functions of marketing at an advanced level. Students will study the basic principles of consumer behavior and examine the application of theories from psychology, social psychology, and economics. The relationship between consumer behavior and marketing activities will be reviewed.*
Prerequisite(s)/ Corequisite(s)	Principles of Business Management; Marketing Fundamentals

Credits	2 semester course, 2 semesters required, 1-2 credits per semester, 4 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas Counts as a quantitative reasoning course*	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Distributive Education 9-12	
Rules 46-47	● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist with specific experience in strategic marketing	
Rules 2002	● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist with specific experience in strategic marketing	
REPA/REPA 3	● CTE: Marketing 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● Workplace Specialist with specific experience in strategic marketing	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	MKTG 201: Introduction to Market Research, MKTG 230: Consumer Behavior	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC – CT Business Administration (52.0201), TC Business Administration (52.0201), Business Administration, A.S. (52.0201)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Marketing Research***	
5918.D1.1	Define market research and its importance in the marketplace.	
5918.D1.2	Analyze the marketing research process.	
5918.D1.3	Create effective questionnaires.	
5918.D1.4	Distinguish between data collection techniques.	

5918.D1.5	Evaluate different tabulation techniques.
5918.D1.6	Demonstrate proper proposal and report writing.
Domain	***Consumer Behavior***
5918.D2.1	Define consumer behavior and examine its relationship to the marketing mix.
5918.D2.2	Summarize the factors that affect consumer behavior including consumer motivation, lifestyle, product quality, economics, advertising, and buying habits.
5918.D2.3	Interpret the consumer decision process in relation to consumer buying habits.
5918.D2.4	Discuss and analyze the buyer's psychological and social psychological actions and reactions.
5918.D2.5	Explain how consumer behavior principles can be applied practically to the professional practice of marketing.
5918.D2.6	Apply the concepts of consumer behavior that affect marketing management decisions.
5918.D2.7	Explain the ethical and societal implications of consumer behavior in marketing.

Small Business Operations Capstone		
Career Cluster	Financial Services; Marketing, Sales, & Entrepreneurship	
Program of Study	Insurance, Entrepreneurship, Marketing and Sales	
NLPS Sequence	D	
Course Code	7201	
Course Description	*The Business Management Capstone is an applied course, and students will be implementing the correct legal, business, human resources, operations, marketing and financial structures after de- risking their idea and launching their business.*	
Prerequisite(s)/ Corequisite(s)	Required Prerequisites: Any CTE Business Concentrator Sequence except Business Administration	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X	
Additional Notes	Recommended Capstone course for Entrepreneurship, Insurance, and Marketing and Sales Programs of Study	
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9- 12	

	● Occupational Specialist I, II or III in related course approved for a CTE pathway
Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 105: Principles of Management, BUSN 201: Business Law, ACCT 101: Financial Accounting, ENTR 220: Small Business Operations
VU Course Alignment	MGMT 250: Introduction to Management
Four Yr. Course Alignment	
Postsecondary Credential	VU – A.S. Business Administration (52.0201), A.S. Business Management (52.0101)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Management***
7201.D1.1	Define management, managers, and the basic management functions.
7201.D1.2	Evaluate classical, behavioral, quantitative, and contemporary management theories regarding process, motivation, and expected outcomes. Distinguish between the external, task, and internal environments of organizations.
7201.D1.3	Discuss social responsibility, the meaning of ethics in the business setting, and social audit.
7201.D1.4	Assess the roles of goals and goal setting in the planning process and identify barriers that may interfere with goal setting.
7201.D1.5	Appraise the strategic planning process and the process of strategy implementation.
7201.D1.6	Structure and support the steps in the decision-making process.
7201.D1.7	Identify and describe the major purposes for and types of forecasting techniques.

7201.D1.8	Discuss the nature of work specialization, departmentalization, and scheduling within the scope of management.
7201.D1.9	Discuss how organizational activities are coordinated and describe the management of organizational conflict.
7201.D1.10	Appraise international business practices and evaluate against cultural and political values.
Domain	***Business Law***
7201.D2.1	Discuss state and federal judicial systems and jurisdictions.
7201.D2.2	Identify the sources of laws as applied to business.
7201.D2.3	Apply appropriate legal principles to contractual obligations.
7201.D2.4	Understand the parameters of the various business structures.
7201.D2.5	Apply the laws of agency and debt adjustment to factual situations.
7201.D2.6	Recognize the obligations and rights of parties to negotiate instruments.
7201.D2.7	Recognize the rights and obligations of parties as regards personal and real property.
7201.D2.8	Recognize the rights and obligations of the parties to sales and lease of goods contracts.
7201.D2.9	Apply the Uniform Commercial Code to sales contracts and differentiate common law and Uniform Commercial Code situations.
7201.D2.10	Understand the application of consumer protection laws.
7201.D2.11	Recognize the importance of both Federal and State employment laws to effective organizational leadership.
7201.D2.12	Understand the importance of protecting intellectual property rights.
Domain	***Accounting***
7201.D3.1	Recognize the meaning and function of accounting, its importance, and basic US accounting rules and the body most responsible for their development.
7201.D3.2	Use the accounting cycle, including analyzing and recording transactions and preparing basic financial statements in accordance with accrual accounting principles.
7201.D3.3	Account for buying and selling merchandise, including using LIFO, FIFO, and weighted average to assign values to cost of goods sold and ending inventory.
7201.D3.4	Recognize the purpose, advantages, disadvantages, and limitations of internal controls. Prepare a bank reconciliation.
7201.D3.5	Account for uncollectible accounts receivable using the allowance method.
7201.D3.6	Account for notes receivable, including interest accruals.
7201.D3.7	Account for notes payable, including interest accruals. Recognize acceptable accounting for basic payroll and other short-term liabilities.
7201.D3.8	Recognize the cost of a plant asset and use accepted method(s) to depreciate a plant asset. Account for the disposal of plant assets. Recognize acceptable accounting for other non-current assets.
7201.D3.9	Calculate the present value of bonds at issuance and account for borrowing by issuing bonds.
7201.D3.10	Account for issuing common and preferred stock, treasury stock transactions, and for dividends.
7201.D3.11	Prepare a multi-step income statement and a classified balance sheet. Given cash pieces, prepare a statement of cash flows
7201.D3.12	Analyze a set of financial statements for profitability and liquidity.
7201.D3.13	Communicate effectively both orally and in writing, using professional, business English.
Domain	***Small Business Operations***

7201.D4.1	Create a growth and development action plan for a launched business.
7201.D4.2	Apply asset management principles and compare and contrast the different asset classes and their functions as wealth management tools.
7201.D4.3	Examine the basic methods of business valuation
7201.D4.4	Explore strategies for effective human resource recruitment and management.
7201.D4.5	Evaluate strategies for financing a growing firm.
7201.D4.6	Apply the calculations, withholding requirements, payments, and filing requirements related to payroll taxes.
7201.D4.7	Assess which income tax returns apply to different business entities at the federal, state, and local levels and explain the information needed for each.
7201.D4.8	Build the organizational structure and personnel function related to the entrepreneurial firm.

Public Service & Safety

Advanced Career & Technical Education, College Credit: Public Service and Safety	
Career Cluster	Public Service and Safety
Program of Study	
NLPS Sequence	
Course Code	6136
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited postsecondary institution through an adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint program of study involving a postsecondary partnership.*
Prerequisite(s)/ Corequisite(s)	None Recommended: CTE courses that would help prepare the student for success in this area
Credits	1 semester course, up to 3 credits per semester, may be offered for successive semesters up to 12 credits
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Appropriate Vocational license ● Standard Trade & Industrial: Fireman Training K-12 ● Standard Trade & Industrial: Law Enforcement Training K-12
Rules 46-47	● Appropriate Vocational license ● Standard Trade & Industrial: Fireman Training 9-12 ● Occupational Specialist I, II or III: Fireman Training 9- 12 ● Standard Trade & Industrial: Law Enforcement Training 9-12 ● Occupational Specialist I, II or III: Law Enforcement Training 9-12
Rules 2002	● Appropriate CTE license ● CTE: Trade & Industrial: Fire Science ● Workplace Specialist: Fire Science ● Workplace Specialist: First Responder ● CTE: Trade & Industrial: Law Enforcement Training

	● Workplace Specialist: Law Enforcement Training
REPA/REPA 3	● Appropriate CTE license ● CTE: Trade & Industrial Fire Science 5- 12 ● Workplace Specialist: Fire & Rescue 9- 12 ● Workplace Specialist: First Responder 9-12 ● CTE: Trade & Industrial Law Enforcement Training 5-12 ● Workplace Specialist: Criminal Justice 9-12 ● CTE: Trade & Industrial: Legal/Law Professionals 5-12 ● Workplace Specialist: Legal/Law Professionals 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Public Safety: Special Topics	
Career Cluster	Public Service and Safety
Program of Study	
NLPS Sequence	
Course Code	6154
Course Description	*Public Safety: Special Topics is an extended learning experience designed to address the advancement and specialization of careers within the career cluster through the provision of a specialized course for a specific workforce need in the school's region. The learning experience is at a qualified site, and is designed to give the student the opportunity to learn and practice technical skills while working under the direction of an appropriately licensed professional. Throughout the course, students will focus on learning about employment opportunities and obtaining the knowledge, skills, and attitudes essential for success in specific occupations. Course standards and curriculum must be tailored to the specific profession, preparing*

	students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. Participation in a related CTSO encourages the development of leadership, communication and career related skills, and opportunities for community service.
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, may be offered for successive semesters up to 12 credits
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE funding
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Appropriate Vocational license ● Standard Trade & Industrial: Fireman Training K-12 ● Standard Trade & Industrial: Law Enforcement Training K-12
Rules 46-47	● Appropriate Vocational license ● Standard Trade & Industrial: Fireman Training 9-12 ● Occupational Specialist I, II or III: Fireman Training 9- 12 ● Standard Trade & Industrial: Law Enforcement Training 9-12 ● Occupational Specialist I, II or III: Law Enforcement Training 9-12
Rules 2002	● Appropriate CTE license ● CTE: Trade & Industrial: Fire Science ● Workplace Specialist: Fire Science ● Workplace Specialist: First Responder ● CTE: Trade & Industrial: Law Enforcement Training ● Workplace Specialist: Law Enforcement Training
REPA/REPA 3	● Appropriate CTE license ● CTE: Trade & Industrial Fire Science 5- 12 ● Workplace Specialist: Fire & Rescue 9- 12 ● Workplace Specialist: First Responder 9-12 ● CTE: Trade & Industrial Law Enforcement Training 5-12 ● Workplace Specialist: Criminal Justice 9-12 ● CTE: Trade & Industrial: Legal/Law Professionals 5-12 ● Workplace Specialist: Legal/Law Professionals 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	

VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Introduction to Public Service and Safety		
Career Cluster	Public Service and Safety	
Program of Study		
NLPS Sequence	Introductory	
Course Code	7190	
Course Description	*Introduction to Public Service and Safety introduces students to a variety of available careers and areas of interest including Fire Science, Criminal Justice, Homeland Security, Environmental Health and Safety, Emergency Medical Services, and Legal Services. The course is designed to help students create a career plan for the public service and safety sectors which includes certification requirements and hiring practices.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status		
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma	
ADDITIONAL COURSE INFO		
Funding	Introductory	
Bulletin 400	● Appropriate Vocational license ● Standard Trade & Industrial: Fireman Training K-12 ● Standard Trade & Industrial: Law Enforcement Training K-12	
Rules 46-47	● Appropriate Vocational license	

	● Standard Trade & Industrial: Fireman Training 9-12 ● Occupational Specialist I, II or III: Fireman Training 9- 12 ● Standard Trade & Industrial: Law Enforcement Training 9-12 ● Occupational Specialist I, II or III: Law Enforcement Training 9-12
Rules 2002	● Appropriate CTE license ● CTE: Trade & Industrial: Fire Science ● Workplace Specialist: Fire Science ● Workplace Specialist: First Responder ● CTE: Trade & Industrial: Law Enforcement Training ● Workplace Specialist: Law Enforcement Training
REPA/REPA 3	● Appropriate CTE license ● CTE: Trade & Industrial Fire Science 5-12 ● Workplace Specialist: Fire & Rescue 9-12 ● Workplace Specialist: First Responder 9-12 ● CTE: Trade & Industrial Law Enforcement Training 5-12 ● Workplace Specialist: Criminal Justice 9-12 ● CTE: Trade & Industrial: Legal/Law Professionals 5-12 ● Workplace Specialist: Legal/Law Professionals 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
7190.D1.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
7190.D1.2	Explain the benefits and responsibilities of being a member of a CTSO.
7190.D1.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
7190.D1.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***

7190.D2.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
7190.D2.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster
7190.D2.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
7190.D2.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society
7190.D2.5	Complete one or more career cluster aptitude/interest surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest
7190.D2.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
7190.D2.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster
Domain	***Public Safety Responsibilities***
7190.D2.1	Investigate the interaction and interdependency of Police, Fire, Emergency Medical Services, and 911 Communication Systems.
7190.D2.2	Identify a variety of organizational structures in the law enforcement and corrections field (corrections, probation, courts, patrol, fish and wildlife, narcotics).
7190.D2.3	Identify a variety of organizational structures in fire services (fire fighter, fire medic).
7190.D2.4	Identify emergency medical services (EMT to paramedic careers, equipment, requirements).
Domain	***Public Safety Requirements***
7190.D3.1	Understand the common objectives and mission of public safety - solve problems, save lives, and protect property.
7190.D3.2	Demonstrate procedures to respond to emergency incidents on any scale, small to catastrophic through role play/case study scenarios.
7190.D3.3	Understand the appropriate level of nutrition, fitness, and agility required by public safety career fields by charting different agility assessments and techniques for preparing for exams.
7190.D3.4	Understand the skills and equipment needed to deal with the most protective service/public safety situations from local emergencies to area-wide incidents.
7190.D3.1	Demonstrate the skills and equipment needed to deal effectively with emergency situations my role playing a variety of emergency scenarios.
Domain	***Criminal Justice Basics***
7190.D4.1	Examine the Constitution as a foundation for criminal justice.
7190.D4.2	Identify and analyze the three components of the criminal justice system (police, courts, corrections).
7190.D4.3	Identify the eight violent crimes, as well as non-violent crimes and analyze the differentiation in classification.
7190.D4.4	Examine why there is crime in American society.

7190.D4.5	Explore and analyze the history of crime in the U.S.
7190.D4.6	Analyze crime statistics and the reporting of crime.
7190.D4.7	Identify and analyze the effects of crime in the U.S.
7190.D4.8	Explore and analyze the history, principles, and evolution of criminal law.
7190.D4.9	Examine the Bill of Rights and its connection to criminal law.
7190.D4.10	Identify the functions and roles of police in society.
7190.D4.11	Analyze the role of police in relation to laws.
7190.D4.12	Identify the similarities and differences between probation and parole.
7190.D4.13	Identify and analyze the juvenile justice system and how it relates to the wider criminal justice system.
7190.D4.14	Identify similarities and difference between jail and prison.
7190.D4.15	Examine the concept of rehabilitation in relation to the criminal justice system.
Domain	***Law and Paralegal Basics***
7190.D5.1	Identify and explain the three court jurisdictions (general, limited, appellate).
7190.D5.2	Examine local, limited, and appellate court proceedings.
7190.D5.3	Identify the steps and policies/laws related to the sentencing process.
7190.D5.4	Define and compare roles within a typical legal firm (lawyer, legal secretary, paralegal).
7190.D5.5	Analyze common fields of law practice (i.e., bankruptcy law, civil rights law, constitutional law, criminal law, family law, immigration law, real estate law, tax law)
7190.D5.6	Define common terminology related to the paralegal field (i.e., procedural law, compensatory damages, contract, demurrer, deposition, felony, misdemeanor, punitive damages, statute, title search, tort)

Public Service & Safety Criminal Justice							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7193	Principles of Criminal Justice	7191	Law Enforcement Fundamentals	7188	Corrections and Cultural Awareness	7231	Criminal Justice Capstone

Principles of Criminal Justice		
Career Cluster	Public Service & Safety	
Program of Study	Criminal Justice	
NLPS Sequence	A	
Course Code	7193	
Course Description	*Principles of Criminal Justice covers the purposes, functions, and history of the three primary parts of the criminal justice system: law enforcement, courts, and corrections. This course further explores the interrelationships and responsibilities of these three primary elements of the criminal justice system.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Law Enforcement Training K-12	
Rules 46-47	● Standard Trade & Industrial: Law Enforcement Training 9-12 ● Occupational Specialist I, II or III: Law Enforcement Training 9-12	
Rules 2002	● CTE: Trade & Industrial:Law Enforcement Training ● Workplace Specialist: Law Enforcement Training	
REPA/REPA 3	● CTE: Trade & Industrial: Criminal Justice 5-12 ● Workplace Specialist: Criminal Justice 9-12 ● Workplace Specialist: Law Enforcement9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course	CRIM 101: Introduction to Criminal Justice Systems, CRIM 134: Introduction to Criminal	

Alignment	Justice Careers
VU Course Alignment	CRIM 100: Survey of Criminal Justice
Four Yr. Course Alignment	BSU – CJC 101: Introduction to American Criminal Justice System
Postsecondary Credential	BSU - B.A./B.S. in Criminal Justice and Criminology (43.0104) ITCC - TC Criminal Justice (43.0104) VU - CG Law Enforcement (43.0107)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University, COMM 101: Fundamentals of Public Speaking or COMM 102: Introduction to Interpersonal Communication VU - ENGL 101: English Composition I; COMM 143: Speech or COMM 148: Interpersonal Communication; Social Science Elective 3 hours; UCC Elective 6 hours.
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Intro to Criminal Justice Systems***
7193.D1.1	Demonstrate an understanding of the sources of American criminal law.
7193.D1.2	Explain how law defines the elements of a crime.
7193.D1.3	Discuss the correlations of crime.
7193.D1.4	Explain the biological, psychological, and sociological determinants of crime.
7193.D1.5	Analyze the defenses against criminal charges.
7193.D1.6	Discuss the evolution of the American system of law and justice.
7193.D1.7	Describe and explain the three major components of the criminal justice system.
7193.D1.8	Evaluate the various issues in law enforcement and police behavior.
7193.D1.9	Explain the process of adjudication from accusation through sentencing.
7193.D1.10	Discuss the elements of the correctional system drawing from the concepts of punishment, rehabilitation, and reform.
7193.D1.11	Demonstrate an understanding of the problems facing the American correctional system.
7193.D1.12	Evaluate the advantages and disadvantages of community correction measures.
7193.D1.13	Recognize the role of oneself and one's culture through multiple frames of reference, including the perception of others from around the world as it applies to law and crime.
7193.D1.14	Demonstrate aptitude to appropriately adapt one's own practices, values, and behaviors related to criminal justice when encountering diverse perspectives from around the world.
Domain	***Intro to Criminal Justice Careers***
7193.D2.1	Describe the three major components of the criminal justice system.
7193.D2.2	Evaluate functional distinctions among criminal justice careers.
7193.D2.3	Discuss and demonstrate an understanding of employment trends.
7193.D2.4	Demonstrate critical thinking in a process of career decision-making.
7193.D2.5	Demonstrate functional writing and oral presentation competencies in describing and drafting a career plan.
7193.D2.6	Prepare a personal strategy for job attainment and career enhancement.

Domain	Career Navigation
7193.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7193.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7193.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7193.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
7193.D3.5	Understand the job application process, how to tailor a resume, prepare for an interview, and create a professional network and references related to the program of study.
Domain	***Leadership and Employability Skills***
7193.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7193.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7193.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7193.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7193.D5.1	Demonstrate computer literacy skills and basic computer functions.
7193.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7193.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7193.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Law Enforcement Fundamentals	
Career Cluster	Public Service & Safety
Program of Study	Criminal Justice
NLPS Sequence	B
Course Code	7191
Course Description	*Law Enforcement Fundamentals critically examines the history and nature of the major theoretical perspectives in criminology and the theories found within those perspectives. Students analyze the research support for such theories and perspectives and the connections between theory and criminal justice system practice within all the major components of the criminal justice system. The course will allow students to demonstrate the application of specific theories to explain violent and non-violent criminal behavior on both the micro and macro levels of analysis. Additionally, this course will introduce fundamental law enforcement operations and organization. This includes the evolution of law enforcement at federal, state,*

	and local levels.
Prerequisite(s)/ Corequisite(s)	Principles of Criminal Justice
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Law Enforcement Training K-12	
Rules 46-47	● Standard Trade & Industrial: Law Enforcement Training 9-12 ● Occupational Specialist I, II or III: Law Enforcement Training 9-12	
Rules 2002	● CTE: Trade & Industrial:Law Enforcement Training ● Workplace Specialist: Law Enforcement Training	
REPA/REPA 3	● CTE: Trade & Industrial: Criminal Justice 5-12 ● Workplace Specialist: Criminal Justice 9-12 ● Workplace Specialist: Law Enforcement 9-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	CRIM 110: Introduction to Law Enforcement; CRIM 105: Introduction to Criminology
VU Course Alignment	CRIM 101: Basic Police Operations ; CRIM 150: Introduction to Criminology
Four Yr. Course Alignment	BSU – CJC 102: Introduction to Criminology, CJC 230: Introduction to Policing
Postsecondary Credential	BSU - B.A./B.S. in Criminal Justice and Criminology (43.0104) ITCC - TC Criminal Justice (43.0104) VU - CG Law Enforcement (43.0107)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University, COMM 101: Fundamentals of Public Speaking or COMM 102: Introduction to Interpersonal Communication VU - ENGL 101: English Composition; COMM 143: Speech or COMM 148: Interpersonal Communication; Social Science Elective 3 hours; UCC Elective 6 hours.
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Law Enforcement***
7191.D1.1	Discuss the history of policing.
7191.D1.2	Explain the role and function of policing in a democratic society as it pertains to the Constitution.

7191.D1.3	Develop a profile of the personality that is attracted to policing.
7191.D1.4	Demonstrate an understanding of the scope of administrative functions in a police department.
7191.D1.5	Discuss the various operations involved in police work including, but not limited to, line and support functions, crime control strategies, search and seizure, arrest, and interrogation.
7191.D1.6	Develop and demonstrate knowledge of special problems for police.
7191.D1.7	Explain the special problem of stress as it pertains to the work of policing.
7191.D1.8	Analyze the problem of deadly force and police brutality connected with police work.
7191.D1.9	Interpret the specific problems associated with police corruption and its impact on credibility.
7191.D1.10	Discuss the role and impact of the introduction of women into the police force.
7191.D1.11	Explain the importance of including minorities into the police force.
Domain	***Criminology***
7191.D2.1	Identify the major theoretical perspectives in criminology and understand their ideological basis.
7191.D2.2	Evaluate the connection between ideology, theory, and practice in the criminal justice system.
7191.D2.3	Discuss the role of criminological research within the broader context of social, political, and economic inequality in America.
7191.D2.4	Apply a specific criminological theory to explain a celebrated crime.
7191.D2.5	Discuss the effects of criminological theories on best practices in corrections and sentencing.
7191.D2.6	Critique the various rationales for punishment.
7191.D2.7	Discuss the policy implications of criminological theories on crime reduction consistent with available research.
7191.D3.1	Understand the Bill of Rights and how these are connected to the criminal justice system.

Corrections and Cultural Awareness	
Career Cluster	Public Service & Safety
Program of Study	Criminal Justice
NLPS Sequence	C
Course Code	7188
Course Description	*Corrections and Cultural Awareness emphasizes the study of American criminal justice problems and systems in historical and cultural perspectives, as well as discussing social and public policy factors affecting crime. Multidisciplinary and multicultural perspectives are stressed. Additionally, this course takes a further examination of the American correctional system and the study of administration of local, state, and federal correctional agencies. The examination also includes the history and development of correctional policies and practices, criminal sentencing, jails, prisons, alternative sentencing, prisoner rights, rehabilitation, and community corrections including probation and parole. Current philosophies of corrections and the debates surrounding the roles and effectiveness of criminal sentences, institutional procedures, technological developments, and special populations are discussed.*
Prerequisite(s)/ Corequisite(s)	Principles of Criminal Justice; Law Enforcement Fundamentals

Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Law Enforcement Training K-12	
Rules 46-47	● Standard Trade & Industrial: Law Enforcement Training 9-12 ● Occupational Specialist I, II or III: Law Enforcement Training 9-12	
Rules 2002	● CTE: Trade & Industrial:Law Enforcement Training ● Workplace Specialist: Law Enforcement Training	
REPA/REPA 3	● CTE: Trade & Industrial: Criminal Justice 5-12 ● Workplace Specialist: Criminal Justice 9-12 ● Workplace Specialist: Law Enforcement9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	CRIM 103: Cultural Awareness; CRIM 130: Introduction to Corrections	
VU Course Alignment	CRIM 145: Ethics and Professionalism in Criminal Justice	
Four Yr. Course Alignment	BSU – CJC 240: Introduction to Corrections	
Postsecondary Credential	BSU - B.A./B.S. in Criminal Justice and Criminology (43.0104) ITCC - TC Criminal Justice (43.0104) VU - CG Law Enforcement (43.0107)	
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University, COMM 101: Fundamentals of Public Speaking or COMM 102: Introduction to Interpersonal Communication VU - ENGL 101: English Composition I; COMM 143: Speech or COMM 148: Interpersonal Communication; Social Science Elective 3 hours; UCC Elective 6 hours.	
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Introduction to Corrections***	
7188.D1.1	Discuss the origins and history of American corrections.	
7188.D1.2	Understand the major purposes of corrections and how they influence correctional policies.	
7188.D1.3	Analyze the nature of inmate behavior and the management of that behavior.	
7188.D1.4	Understand the function of jails, prisons, community corrections, intermediate sanctions, probation, and parole.	
7188.D1.5	Discuss the ethical issues surrounding such topics as the death penalty, race, and poverty.	

7188.D1.6	Research the history and development of laws affecting correctional institutions and the applicability to inmates.
7188.D1.7	Understand the social and political context that shapes the American correctional system.
Domain	
7188.D2.1	Understand how once convicted, due process rights change.
7188.D2.2	Discuss multiculturalism and diversity in the Criminal Justice field.
7188.D2.3	Discuss the pendulum of change in corrections over time.
7188.D2.4	Understand the jurisdiction of various Law Enforcement Agencies including various levels of governments and how governmental branches work together
7188.D2.5	Understand the concept of reasonable person test and looking at the totality of the circumstances involved in an investigation
Domain	***Cultural Awareness***
7188.D3.1	Develop fundamental definitions and concepts of race, ethnicity, discrimination, and minorities.
7188.D3.2	Analyze racial, cultural, and ethnic factors and perspectives in the demographics of victims, offenders, and statistical data related to crimes.
7188.D3.3	Interpret available empirical data related to crime and the criminal to determine the effect of bias or prejudice in the American system of justice and death penalty statutes.
7188.D3.4	Evaluate the American social structure on the basis of discrimination and social and economic inequality.
7188.D3.5	Analyze the relationship between law enforcement agencies and racial and/or ethnic minorities.
7188.D3.6	Analyze the relationship between the judicial system and racial and/or ethnic minorities in the pre-trial procedures, trial, and sentencing.
7188.D3.7	Evaluate the racial and ethnic composition of the offender population in the federal and state correctional systems.
7188.D3.8	Discuss the need for and/or the possibility for change in the criminal justice system for minorities at the local, state, and federal level.
7188.D3.9	Discuss what the goals and outcomes of the criminal justice system are and how success should be measured.
7188.D3.10	Discuss why various law enforcement systems exist.
7188.D3.11	Understand the history of Criminal Justice and current/modern Law Enforcement operations and practices.

Criminal Justice Capstone	
Career Cluster	Public Service & Safety
Program of Study	Criminal Justice
NLPS Sequence	D
Course Code	7231
Course Description	*The Criminal Justice Capstone course allows students to complete additional instruction to earn a postsecondary certificate and should include a work-based learning component such as*

	job shadowing, internship, etc. once the core content is completed. ***Note*** *that there may be age restrictions on work-based learning components.*
Prerequisite(s)/ Corequisite(s)	Principles of Criminal Justice; Law Enforcement Fundamentals, Corrections and Cultural Awareness
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max
Counts Toward	Counts as a Directed Elective or Elective for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	Moderate Value | Level II
Bulletin 400	● Standard Trade & Industrial: Law Enforcement Training K-12
Rules 46-47	● Standard Trade & Industrial: Law Enforcement Training 9-12 ● Occupational Specialist I, II or III: Law Enforcement Training 9-12
Rules 2002	● CTE: Trade & Industrial:Law Enforcement Training ● Workplace Specialist: Law Enforcement Training
REPA/REPA 3	● CTE: Trade & Industrial: Criminal Justice 5-12 ● Workplace Specialist: Criminal Justice 9-12 ● Workplace Specialist: Law Enforcement9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	CRIM 201: Ethics in Criminal Justice; CRIM 120: Introduction to Courts; CRIM 232 Indiana Jail Officer Course; CRIM 280: Internship
VU Course Alignment	CRIM 282: Indiana Jail Officer Certification VU-EC – CRIM 281: Indiana Law Enforcement Certification; CRIM 270: Internship in Law Enforcement
Four Yr. Course Alignment	BSU – CJC 250: Introduction to the Criminal Courts/Judiciary, CJC 229: Decision-Making and Ethics in Criminal Justice
Postsecondary Credential	BSU - B.A./B.S. in Criminal Justice and Criminology (43.0104) ITCC - TC Criminal Justice (43.0104) VU-EC - CG Law Enforcement (43.0107)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 111: Student Success for University, COMM 101: Fundamentals of Public Speaking or COMM 102: Introduction to Interpersonal Communication VU - ENGL 101: English Composition I; COMM 143: Speech or COMM 148: Interpersonal Communication; Social Science Elective 3 hours; UCC Elective 6 hours.
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Ethics in Criminal Justice***

7231.D1.1	Identify and distinguish major ethical theories.
7231.D1.2	Identify current problems and issues relating to ethical behavior in the criminal justice system.
7231.D1.3	Assess and evaluate the ethical dilemmas faced by professionals in the criminal justice system.
7231.D1.4	Apply competing values, theories, policies, and concepts to real and hypothetical problems in the criminal justice system.
7231.D1.5	Describe the political and social implications of various ethical approaches to criminal justice issues.
7231.D1.6	Distinguish between ethical and legal principles.
Domain	***Introduction to Courts***
7231.D2.1	Explain the historical evolution of American courts into their present structure and operations.
7231.D2.2	Understand the social and political context that shapes the American court system.
7231.D2.3	Develop a thorough comprehension of the chronological operation of the adjudication process in the criminal justice system.
7231.D2.4	Discuss the roles of each position involved in the operation of the adjudication process in the criminal justice system.
7231.D2.5	Synthesize from the U.S. Constitution the constitutional rights and principles provided to citizens in the adjudication process.
7231.D2.6	Analyze the constitutional procedural requirements applicable in the pretrial process.
7231.D2.7	Analyze the constitutional procedural requirements applicable in the trial process.
7231.D2.8	Analyze the constitutional procedural requirements applicable in the appeal process.
7231.D2.9	Analyze the responsibilities and interactions of each participant in the courtroom work group.
Domain	***Indiana Jail Officer***
7231.D3.1	Identify and apply techniques used to interact with inmates with a mental illness.
7231.D3.2	Identify and apply techniques used to interact with inmates with developmental disabilities.
7231.D3.3	Identify and apply techniques used to interact with inmates with intellectual disabilities.
7231.D3.4	Identify and apply techniques used to interact with inmates with addictive disorders.
7231.D3.5	Summarize jail procedures, including booking, fingerprinting, report writing, and inmate release.
7231.D3.6	Identify security issues in a jail setting.
7231.D3.7	Apply legal principles of search and seizure and evidence collection in a jail setting.
7231.D3.8	Identify ethical issues in a jail setting.
7231.D3.9	Summarize use of force legal standards.
7231.D3.10	Explain the importance of a culturally competent jail officer.
7231.D3.11	Identify sources of stress potentially harmful to job performance.
Domain	***Internship***
7231.D4.1	Explain the agency's policies and procedures, organizational structure, and its relationship to the community.
7231.D4.2	Explain the major goals of the agency and describe the methods used to realize these goals.
7231.D4.3	Demonstrate communication and problem-solving skills in the internship experience.
7231.D4.4	Demonstrate professionalism in appearance, communication, and prompt reporting for work.
7231.D4.5	Maintain a weekly journal describing and documenting experiences.
7231.D4.6	Demonstrate competence in observing, listening, and writing.

7231.D4.7	Demonstrate ability to identify, assess, and resolve problems during internship experience.
7231.D4.8	Demonstrate effective job search and interview strategies through writing a cover letter, writing a resume, writing a thank you letter, and completing a mock interview.
7231.D4.9	Evaluate the internship experience.

Public Service & Safety Fire and Rescue							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7195	Principles of Fire and Rescue	7189	Fire Fighting Fundamentals	7186	Advanced Fire Fighting	7229	Fire and Rescue Capstone / EMT

Principles of Fire and Rescue		
Career Cluster	Public Service and Safety	
Program of Study	Fire and Rescue	
NLPS Sequence	A	
Course Code	7195	
Course Description	*Principles of Fire and Rescue introduces students to the various roles that firefighters and emergency services workers play to protect the public from the loss of life and property. They are frequently the first emergency personnel at the scene of a traffic accident or medical emergency and may be called upon to put out a fire, treat injuries or perform other vital functions. This course will introduce students to the history, terminology, and basic firefighting skills needed for a beginning firefighter. Additionally, students will develop a career plan for a career in public safety including areas of Fire Science, Homeland Security, and Emergency Medical Services.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Fireman Training K-12	
Rules 46-47	● Standard Trade & Industrial: Fireman Training 9-12 ● Occupational Specialist I, II or III: Fireman Training 9-12	
Rules 2002	● CTE: Trade & Industrial: Fire Science ● Workplace Specialist: Fire Science ● Workplace Specialist: First Responder	
REPA/REPA 3	● CTE: Trade & Industrial Fire Science 5-12	

	● Workplace Specialist: Fire & Rescue 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	HSPS 102: Intro to Public Saftey
VU Course Alignment	FIRE 111: Introduction to Fire & Emergency Services ; FIRE 150: Hazardous Materials – Awareness
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Fire Fighter (43.0203) VU - A.S. Fire Science and Safety Technology (43.0203)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Fire Suppression***
7195.D1.1	Discuss the history of fire service.
7195.D1.2	Discuss personal safety.
7195.D1.3	Identify personal protective equipment.
7195.D1.4	Describe portable fire extinguishers.
7195.D1.5	Define fire behavior.
7195.D1.6	List and describe portable ground ladders.
7195.D1.7	List ventilation types.
7195.D1.8	List and describe nozzles and fittings.
7195.D1.9	Demonstrate tying of knots.
7195.D1.10	Describe forcible entry.
7195.D1.11	List and demonstrate salvage and overhaul.
7195.D1.12	List and describe sprinkler systems.
Domain	***Public Safety Careers***
7195.D2.1	Research Career Opportunities in the field of Public Safety.
7195.D2.2	Describe job opportunities in each of the selected fields within the Public Safety Degree program.
7195.D2.3	Describe relevant knowledge, skills and abilities required for entry level positions in Public Safety.
7195.D2.4	Identify options for obtaining or developing the relevant knowledge, skills and abilities required for entry level positions.
7195.D2.5	Determine certification and licensing requirements for entry level positions in Public Safety.
7195.D2.6	Develop and Individual Academic Plan for completion of a degree in Public Safety.
7195.D2.7	Prepare and present a Cover page, Resume, and Oral presentation for a selected career goal in the field of Public Safety.

Domain	Career Navigation
7195.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7195.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7195.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7195.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7195.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7195.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7195.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7195.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7195.D5.1	Demonstrate computer literacy skills and basic computer functions.
7195.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7195.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7195.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Fire Fighting Fundamentals	
Career Cluster	Public Service and Safety
Program of Study	Fire and Rescue
NLPS Sequence	B
Course Code	7189
Course Description	*Fire Fighting Fundamentals is for those students who are seeking certification as a firefighter. This course will prepare students for the Hazardous Materials Awareness and Operations certifications and will introduce students to NFPA 1001 which serves as the standard of measurement for all fire fighters in North America. Students will learn the knowledge and hands-on practical skills for managing and controlling a hazardous materials incident required for the certifications. Furthermore, students will study how a fire behaves and will learn the basic firefighting skills needed to extinguish a fire while protecting themselves and other firefighters.*
Prerequisite(s)/	Principles of Fire and Rescue

Corequisite(s)		
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Fireman Training K-12	
Rules 46-47	● Standard Trade & Industrial: Fireman Training 9-12 ● Occupational Specialist I, II or III: Fireman Training 9-12	
Rules 2002	● CTE: Trade & Industrial: Fire Science ● Workplace Specialist: Fire Science ● Workplace Specialist: First Responder	
REPA/REPA 3	● CTE: Trade & Industrial Fire Science 5-12 ● Workplace Specialist: Fire & Rescue 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HSPS 122: Hazmat Awareness and Operations; HSPS 165: Fire Fighter I	
VU Course Alignment	FIRE 151: Hazardous Materials – Operations	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Fire Fighter (43.0203) VU - A.S. Fire Science and Safety Technology (43.0203)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	Hazardous Material Awareness and Operations, Fire Fighting I	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Hazardous Materials***	
7189.D1.1	Identify hazardous materials regulations and definitions.	
7189.D1.2	Identify hazardous materials properties and hazards.	
7189.D1.3	Become familiar with the incident solving process.	
7189.D1.4	Identify the seven clues that may be available to identify the presence of a hazardous material.	
7189.D1.5	Become familiar with the incident management elements including incident priorities, management structure, and the problem-solving process.	
7189.D1.6	Identify the various types of personal protective equipment (PPE) including respiratory protection and personal protective equipment for biological, chemical, radiological, nuclear,	

	and explosive incidents. Become familiar with PPE in ensembles, classifications, and selection.
7189.D1.7	Identify contamination and decontamination methods and types.
7189.D1.8	Identify incident-specific strategies and tactics for the nine DOT hazard classes.
7189.D1.9	Define terrorism and identify the different types of terrorist attacks. Identify special operational considerations at terrorist or criminal incidents.
7189.D1.10	Have a working knowledge of various materials and equipment used in the mitigation of hazardous materials incidents.
7189.D1.11	Gain practical experience and pass the evaluation process associated with the hands-on use of the equipment and materials used in mitigation process.
Domain	***Fire Fighting I***
7189.D2.1	Relate the history of fire service through examination.
7189.D2.2	Discuss personal safety as related to all areas of NFPA 1500.
7189.D2.3	Demonstrate the use of all personal protective equipment.
7189.D2.4	Demonstrate the use of portable fire extinguishers.
7189.D2.5	Define fire behavior and how it relates to safety and extinguishment.
7189.D2.6	Demonstrate the proper use of portable ground ladders.
7189.D2.7	List ventilation types and demonstrate the proper use of ventilation equipment.
7189.D2.8	Demonstrate the proper care and use of nozzles and fittings.
7189.D2.9	Demonstrate tying of 6 special fire service knots.
7189.D2.10	Describe/demonstrate forcible entry techniques.
7189.D2.11	List and demonstrate salvage and overhaul techniques.
7189.D2.12	Describe and demonstrate the proper use of SCBA.
7189.D2.13	Discuss and describe building construction concepts as it relates to the fire service.
7189.D2.14	Demonstrate basic rescue and extrication techniques.
7189.D2.15	List the principles of a water supply system.
7189.D2.16	Demonstrate the proper care and use of selected fire hoses.
7189.D2.17	Demonstrate how to develop and use fire streams.
7189.D2.18	Demonstrate the ability to understand NIMS.
7189.D2.19	Describe communications with the public and within the fire service.

Advanced Fire Fighting	
Career Cluster	Public Service and Safety
Program of Study	Fire and Rescue
NLPS Sequence	C
Course Code	7186
Course Description	*Advanced Fire Fighting expands upon the principles and techniques of firefighting learned in Fire Fighting Fundamentals. Students will study fire protection systems, firefighter safety, and survival. Students will also learn what fire is, the chemical hazards of combustion, and related by-products of fire. Additionally, students will gain a better understanding of fire department organization, administration, operations, and basic strategies and tactics.*

Prerequisite(s)/ Corequisite(s)	Principles of Fire and Rescue; Fire Fighting Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Fireman Training K-12	
Rules 46-47	● Standard Trade & Industrial: Fireman Training 9-12 ● Occupational Specialist I, II or III: Fireman Training 9-12	
Rules 2002	● CTE: Trade & Industrial: Fire Science ● Workplace Specialist: Fire Science ● Workplace Specialist: First Responder	
REPA/REPA 3	● CTE: Trade & Industrial Fire Science 5-12 ● Workplace Specialist: Fire & Rescue 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HSPS 167: Fire Fighter II	
VU Course Alignment	FIRE 155: Firefigher I	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Fire Fighter (43.0203) VU – A.S. Fire Science and Safety Technology (43.0203)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	Fire Fighting II	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Fire Fighting II***
7186.D1.1	Application of automatic sprinkler systems.
7186.D1.2	Discuss and demonstrate personal safety as related to all areas of NFPA 1500.
7186.D1.3	Demonstrate the use of all personal protective equipment in a timed manner.
7186.D1.4	Explain fire behavior and the chemical reaction of pyrolysis.
7186.D1.5	Describe/demonstrate forcible entry techniques.
7186.D1.6	Demonstrate the proper use of SCBA in a timed manner.

7186.D1.7	Crawl through maze under simulated fire conditions.
7186.D1.8	Discuss and describe building construction concepts as they relate to the fire service.
7186.D1.9	Demonstrate basic rescue and extrication techniques.
7186.D1.10	List the principles of water supply hydraulics.
7186.D1.11	Demonstrate the proper care and use of selected fire hoses.
7186.D1.12	Demonstrate how to develop and use fire streams.
7186.D1.13	Demonstrate the ability to understand NIMS.
7186.D1.14	Communications with the public and within the fire service.
7186.D1.15	Mount a ladder and ventilate a roof with selected tools.
7186.D1.16	Recognize and select tools related to the fire service.
Domain	***Basic First Aid / CPR***
7186.D2.1	Discuss the importance of body substance isolation.
7186.D2.2	Describe the components of personal protective equipment.
7186.D2.3	Discuss diseases of concern.
7186.D2.4	Describe laws that relate to infection control.
7186.D2.5	Explain the importance of immunizations.
7186.D2.6	Assess the causes, types, symptoms, and ways of dealing with stress.
7186.D2.7	Describe scene safety considerations at hazardous materials incidents and rescue operations.
7186.D2.8	Describe actions required when responding to scenes involving violent or dangerous situations.
7186.D2.9	Discuss the circulatory system.
7186.D2.10	List the links in the chain of survival.
7186.D2.11	Explain actions to be taken before resuscitation.
7186.D2.12	Discuss rescue breathing.
7186.D2.13	Describe the steps of cardiopulmonary resuscitation.
7186.D2.14	Describe CPR techniques for individuals ranging from infant to adult.
7186.D2.15	Discuss indications of effective CPR and when CPR may be interrupted.
7186.D2.16	Summarize when not to begin or to terminate.
7186.D2.17	Summarize actions taken when clearing an airway obstruction.
7186.D2.18	Describe the main components of the circulatory system.
7186.D2.19	Differentiate between arterial, venous, and capillary bleeding.
7186.D2.20	Describe the steps for controlling external bleeding.
7186.D2.21	Discuss internal bleeding.
7186.D2.22	Describe types and signs of shock.
7186.D2.23	Describe the steps for managing shock.

Fire and Rescue Capstone/ EMT	
Career Cluster	Public Service and Safety
Program of Study	Fire and Rescue
NLPS Sequence	D

Course Code	7229	
Course Description	*Fire and Rescue Capstone will prepare students to earn the EMT certification.*	
Prerequisite(s)/ Corequisite(s)	Principles of Fire and Rescue; Fire Fighting Fundamentals, Advanced Fire Fighting	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Standard Trade & Industrial: Fireman Training K-12	
Rules 46-47	● Standard Trade & Industrial: Fireman Training 9-12 ● Occupational Specialist I, II or III: Fireman Training 9-12	
Rules 2002	● CTE: Trade & Industrial: Fire Science ● Workplace Specialist: Fire Science ● Workplace Specialist: First Responder	
REPA/REPA 3	● CTE: Trade & Industrial Fire Science 5-12 ● Workplace Specialist: Fire & Rescue 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	HSPS 125: Emergency Medical Responder; PARM 102: Emergency Medical Technician, HSPS 163: Fire Inspection/Code Enforcement, HSPS 169: Fire and Arson Investigator, HSPS 204: Homeland Security/Public Safety Building and Infrastructure	
VU Course Alignment	FIRE 156: Firefighter II ; EMBT 212: Emergency Medical Technician	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Fire Fighter (43.0203) VU - A.S. Fire Science and Safety Technology (43.0203)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	Emergency Medical Responder; Emergency Medical Technician	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Emergency Medical Responder***	
7229.D1.1	Recognize emergency equipment and supplies.	
7229.D1.2	Maintain emergency equipment and supplies.	

7229.D1.3	Operate emergency equipment.
7229.D1.4	Implement emergency procedures.
7229.D1.5	Recognize when entry into the EMS system is appropriate.
7229.D1.6	Administer first aid including CPR (Red Cross Professional with AED or American Heart Association Healthcare Provider), utilizing universal precautions.
7229.D1.7	Perform one and two rescuer adult, child, and infant CPR.
7229.D1.8	Maintain control of emergency situations.
7229.D1.9	Utilize safety precautions to protect him/herself.
7229.D1.10	Provide reassurance and support in communication with diverse populations.
7229.D1.11	Document incidents appropriately.
7229.D1.12	Discuss legal and ethical ramifications of emergency care.
Domain	***Emergency Medical Technician***
7229.D2.1	Demonstrate competency and integrate comprehensive knowledge of National EMS Educational Standards of the following topic areas: • EMS Systems • Research • Workforce Safety and Wellness • Documentation • EMS System Communication • Therapeutic Communication • Medical, Legal & Ethical Issues
7229.D2.2	Demonstrate competency and integrate comprehensive knowledge of National EMS Educational Standards of the following topic areas: • Anatomy and Physiology • Medical Terminology • Pathophysiology • Lifespan Development • Public Health • Pharmacology • Medication Administration • Emergency Medications
7229.D2.3	Demonstrate competency and integrate comprehensive knowledge of National EMS Educational Standards of the following topic areas: • Airway Management • Respiration • Ventilation • Scene Size-Up • Primary Assessment • History Taking • Secondary Assessment • Monitoring Devices • Reassessment • Medical Overview
7229.D2.4	Demonstrate competency and integrate comprehensive knowledge of National EMS Educational Standards of the following topic areas:

	• Neurological Care • Abdominal and Gastrointestinal Care • Immunology • Infectious Disease • Endocrine Disorders • Psychiatric • Cardiovascular • Toxicology • Respiratory • Hematology • Genitourinary and Renal • Gynecology • Obstetrics • Neonatal Care • Pediatrics • Geriatrics • Patients with Special Challenges • Non-traumatic Musculoskeletal Disorders • Diseases of the Eyes, Ears, Nose and Throat
7229.D2.5	Demonstrate competency and integrate comprehensive knowledge of National EMS Educational Standards of the following topic areas: • Shock and Resuscitation • Trauma Overview • Bleeding • Chest Trauma • Abdominal and Genitourinary Trauma • Orthopedic Trauma • Soft Tissue Trauma • Head, Face, Neck & Spine Trauma • Nervous System Trauma • Special Considerations in Trauma • Environmental Emergencies • Multi-System Trauma
7229.D2.6	Demonstrate competency and integrate comprehensive knowledge of National EMS Educational Standards of the following topic areas: • Principles of Safety Operating a Ground Ambulance • Incident Management • Multiple Casualty Incidents • Air Medical • Vehicle Extrication • Hazardous Materials Awareness • Mass Casualty Incidents due to Terrorism or Disaster
7229.D2.7	Demonstrate competency in the following psychomotor skills as dictated by the Indiana Department of Homeland Security: • Obtain a Patient History from an Alert and Oriented Patient • Comprehensive Normal Adult Physical Assessment Techniques

	• Comprehensive Normal Pediatric Physical Assessment Techniques • Supraglottic Airway • Ventilation of an Apneic Adult Patient • Oxygen Preparation • CPAP • Patient Assessment Trauma Patient • Spinal Immobilization Supine • Joint Injury • Long Bone • Traction Splint • Bleeding Control and Shock Management • Patient Assessment Medical Patient • Intravenous Therapy • Intramuscular Medication Administration • Intranasal Medication Administration • Inhaled Medication Administration • Glucometer • 12 Lead Acquisition • Cardiac Arrest/AED • Normal Delivery with Newborn Care • Abnormal Delivery with Newborn Care
Domain	***Fire Inspection/Code Enforcement***
7229.D3.1	Explain the roles of a fire inspector.
7229.D3.2	Describe state laws pertaining to fire inspections.
7229.D3.3	Explain legal responsibilities of a fire inspector.
7229.D3.4	Interpret records and reports.
7229.D3.5	Illustrate the proper inspection process.
7229.D3.6	Describe combustion and fire growth.
7229.D3.7	Review fire hazards.
7229.D3.8	Describe Building construction and occupancy classification.
7229.D3.9	Identify site access and means of egress.
7229.D3.10	Identify the sprinkler and standpipe system.
7229.D3.11	Identify portable fire extinguishers, special agents extinguishing systems, and fire detection.
7229.D3.12	Identify the fixed fire systems.
7229.D3.13	Identify blueprints for plan review.
7229.D3.14	Identify hazardous materials.
Domain	***Fire and Arson Investigator***
7229.D4.1	Identify and explain the responsibilities of the fire department from a firefighter's perspective when responding to the scene of a fire, including the possibility of incendiary devices often encountered.
7229.D4.2	Compose appropriate notes of cause and origin.
7229.D4.3	Describe the types of building construction.
7229.D4.4	Trace cause and origin of fire.
7229.D4.5	Describe incendiary fire causes.
7229.D4.6	Demonstrate the use of records.

7229.D4.7	Demonstrate techniques of obtaining evidence.
7229.D4.8	Interview and interrogate witnesses.
7229.D4.9	Apply the laws associated with arson.
7229.D4.10	Demonstrate fire scene investigation.
7229.D4.11	Investigate fatal fire.
7229.D4.12	Investigate vehicle fire.
7229.D4.13	Describe the chemistry of fire.
7229.D4.14	Demonstrate sketching and photography.
7229.D4.15	Discuss the basic principles of electricity and identify and explain electrical causes of fires.
7229.D4.16	Explain the role of the fire investigator in the courtroom proceedings including courtroom demeanor and testifying.
7229.D4.17	Identify and list the sources and technology available for fire investigations.
7229.D4.18	Identify and analyze the causes involved in the line of duty firefighter deaths related to structural and wild-land firefighting, training and research and the reduction of emergency risks and accidents.
Domain	***Homeland Security/Public Safety Building and Infrastructure***
7229.D5.1	Describe implications of the six roof designs for firefighting practices.
7229.D5.2	Discuss issues related to collapse of buildings.
7229.D5.3	Compare the three standpipe classes.
7229.D5.4	Examine the four types of automatic sprinkler systems.
7229.D5.5	Describe principles of construction relating to structural protection from collapse.
7229.D5.6	Examine special problems of buildings under construction.
7229.D5.7	Discuss principles of fire resistance of structures.
7229.D5.8	Describe properties of concrete and use as a structural material.
7229.D5.9	Discuss principles of fire growth in buildings.
7229.D5.10	Describe the principles of smoke movement in buildings.
7229.D5.11	Describe design concepts of trusses.
7229.D5.12	Demonstrate an understanding of building construction as it relates to fire fighter and public safety, building codes, fire prevention, code inspection, firefighting strategy and tactics and evacuation of structures.
7229.D5.13	Analyze the hazards and tactical considerations associated with the various types of structures.

Public Service & Safety Paralegal Studies							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7194	Principles of Paralegal Studies	7192	Paralegal Fundamentals	7187	Advanced Paralegal Studies	7227	Paralegal Studies Capstone

Principles of Paralegal Studies		
Career Cluster	Public Service & Safety	
Program of Study	Paralegal Studies	
NLPS Sequence	A	
Course Code	7194	
Course Description	*Principles of Paralegal Studies introduces the student to a broad understanding of the American legal system. Students will engage with and learn about the various court structures, the key players within the system, and how our rules and laws are made, enforced, interpreted and applied. The course will cover substantive legal topics and provide hands-on learning regarding legal research, legal writing, case briefing, interviewing skills, and professional ethics. The course will examine the rules of professional conduct that apply to all legal professionals including the American Bar Association Model Rules of Professional Conduct, the Indiana Rules of Professional Conduct, the American Bar Association Guidelines for the Utilization of Legal Assistants, and various other sets of rules of conduct created by paralegal associations.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● No License Available	

Rules 2002	● No License Available
REPA/REPA 3	● CTE: Trade & Industrial: Legal/Law Professionals 5-12 ● Workplace Specialist: Legal/Law Processionals 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	LEGS 101: Intro to Legal Studies; LEGS 170: Legal Ethics
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT Paralegal Studies (22.0302); TC Paralegal Studies (22.0302)
Liberal Arts/Sciences Requirements	ENGL 111: English Composition; IVYT 116: Student Success in Public Service
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Legal Studies***
7194.D1.1	Examine various levels of our court systems and how they differ from other systems around the world.
7194.D1.2	Demonstrate an understanding of jurisdiction and the concept of due process.
7194.D1.3	Identify the differences between civil and criminal law.
7194.D1.4	Discuss various skills needed in the legal profession, such as legal research, legal writing, interviewing and case briefing.
7194.D1.5	Know and situationally apply rules of professional responsibility and legal ethics.
Domain	***Legal Ethics***
7194.D2.1	Describe how attorneys are licensed and regulated.
7194.D2.2	Describe the role that the American Bar Association plays in the regulation of lawyers and paralegals.
7194.D2.3	Describe the role that national paralegal associations play in the promotion of professional rules of conduct for paralegals.
7194.D2.4	Distinguish between paralegal licensure and paralegal certification.
7194.D2.5	Demonstrate an understanding of the application of the primary rules of lawyer conduct that affect the performance of paralegals.

7194.D2.6	Distinguish between authorized tasks that paralegals can perform and the unauthorized practice of law.
7194.D2.7	Distinguish between the ethics doctrine of lawyer-client confidentiality and the discovery doctrines of attorney client privilege and the work product rule.
7194.D2.8	Demonstrate an understanding of the common conflicts of interest that are likely to arise in the law office.
7194.D2.9	Distinguish between the imputed disqualification rules that apply to lawyers and imputed disqualification rules that apply to paralegals.
7194.D2.10	Distinguish advertising from solicitation and demonstrate an awareness of how a paralegal's conduct is proscribed by the advertising and solicitation rules.
7194.D2.11	Distinguish the types of legal fees, and what makes a legal fee unreasonable.
Domain	***Career Navigation***
7194.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7194.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7194.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7194.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7194.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7194.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7194.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7194.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7194.D5.1	Demonstrate computer literacy skills and basic computer functions.
7194.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7194.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7194.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Paralegal Fundamentals		
Career Cluster	Public Service & Safety	
Program of Study	Paralegal Studies	
NLPS Sequence	B	
Course Code	7192	
Course Description	*Paralegal Fundamentals introduces the student to legal research resources including constitutions, statutory codes and annotations, administrative encyclopedias, treatises, legal periodicals, practice manuals, and form books. Students are introduced to various finding tools for accessing information in these resources. Students will learn proper legal citation forms, citation services, and research strategy. Projects include a series of graded law library research assignments teaching the student how to use this variety of materials to research both primary and secondary legal authorities using methodologies for research in either print or online sources and updating material to ensure the most up-to-date research possible. The course is designed to improve the student's ability to write at a professional level, with appropriate attention to grammar, sentence structure, and style. Students will become familiar with basic legal terminology. This course will also develop the student's legal writing skills, including how to write sharp, clear prose and become more proficient and efficient at composing, organizing, and summarizing a wide variety of legal written documents. The student will be exposed to various legal writing techniques that are used in drafting a wide variety of legal documents. A strong emphasis is placed on proper legal writing methodology and formatting.*	
Prerequisite(s)/ Corequisite(s)	Principles of Paralegal Studies	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● No License Available	
Rules 2002	● No License Available	
REPA/REPA 3	● CTE: Trade & Industrial: Legal/Law Professionals 5-12 ● Workplace Specialist: Legal/Law Processionals 9-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	LEGS 102: Legal Research; LEGS 124: Legal Writing I
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT Paralegal Studies (22.0302); TC Paralegal Studies (22.0302)
Liberal Arts/Sciences Requirements	ENGL 111: English Composition; IVYT 116: Student Success in Public Service
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Legal Research***
7192.D1.1	Identify and locate primary legal authority, including constitutions, statutes, administrative materials, and appellate court decisions
7192.D1.2	Explain and distinguish between primary and secondary authority.
7192.D1.3	Explain and distinguish between mandatory and persuasive authority and determine which legal material should be presented to a court.
7192.D1.4	Describe the relationship between trial and appellate courts and how precedent is used in deciding cases.
7192.D1.5	Locate statutes and their related case annotations in a federal annotated statutory set or an Indiana annotated code set.
7192.D1.6	Differentiate between official and unofficial publications of primary authority.
7192.D1.7	Formulate proper citation forms for primary and secondary authorities.
7192.D1.8	Validate legal authority through use of a citation service.
7192.D1.9	Identify and locate secondary legal sources such as legal encyclopedia, legal treatises, practice manuals, and form books
7192.D1.10	Discuss the role of free web-based sources of legal material and non-legal material
7192.D1.11	Integrate both free sources and subscription sources into the process of legal research.
7192.D1.12	Examine the role of a paralegal in legal research conforming to the Indiana rules of professional conduct.
Domain	***Legal Writing I***
7192.D2.1	Understand and apply the rules of English grammar and style.

	• Word usage, including common errors • Punctuation • Capitalization • Grammar • Rules of composition • Formal writing style • Sentence structure
7192.D2.2	Demonstrate familiarity with legal terminology.
7192.D2.3	Demonstrate the ability to write at a professional level.

Advanced Paralegal Studies		
Career Cluster	Public Service & Safety	
Program of Study	Paralegal Studies	
NLPS Sequence	C	
Course Code	7187	
Course Description	*Advanced Paralegal Studies introduces the student to the Indiana Trial Rules, court rules, local rules, and small claims, specifically knowing the Rules of Civil Procedure and how they apply to each part of a case. Topics include filing requirements, the rules regarding service of process, calculation of deadlines, motion practice, discovery, trials, and relief from judgements. This course will also develop the student's legal writing skills, including how to write sharp, clear prose and become more proficient and efficient at composing, organizing, and summarizing a wide variety of legal written documents. The student will be exposed to various legal writing techniques that are used in drafting a wide variety of legal documents. A strong emphasis is placed on proper legal writing methodology and formatting.*	
Prerequisite(s)/ Corequisite(s)	Principles of Paralegal Studies; Paralegal Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● No License Available	

Rules 46-47	● No License Available
Rules 2002	● No License Available
REPA/REPA 3	● CTE: Trade & Industrial: Legal/Law Professionals 5-12 ● Workplace Specialist: Legal/Law Processionals 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	LEGS 103: Civil Procedure; LEGS 202: Litigation
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT Paralegal Studies (22.0302); TC Paralegal Studies (22.0302)
Liberal Arts/Sciences Requirements	ENGL 111: English Composition; IVYT 116: Student Success in Public Service
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Civil Procedure***
7187.D1.1	Differentiate between state and federal procedure. Review local rules.
7187.D1.2	Identify jurisdictional requirements for lawsuits.
7187.D1.3	Compare various Statutes of Limitation.
7187.D1.4	Identify parties to a lawsuit. Explain requirements for joinder of claims and parties, interpleader, and class actions.
7187.D1.5	Explain the process for filing and serving a complaint according to federal, state, and local rules.
Domain	***Litigation***
7187.D2.1	Compare and contrast various Indiana Trial Rules with various Indiana Rules of Civil procedure.
7187.D2.2	Compare and contrast various Federal Trial Rules with various Federal Rules of Civil Procedure.
7187.D2.3	Prepare a trial notebook that includes the ability to draft and explain the following: • Intake Client Information Sheet

	• Checklist and Intake Memorandum • Internal Memorandum • Complaint • Answer • Counterclaim • Discovery • Deposition Summary • Motion of Summary Judgment • Exhibit Summary List • Trial Brief • Jury Instruction Notice of Appeal
7187.D2.4	Schedule an index deposition.
7187.D2.5	Summarize the purpose of calendaring.
7187.D2.6	Explain the time limitation for the filing of and/or responding to various pleadings, motions, and requests.
7187.D2.7	Explain and justify the order of presentation of various witnesses
7187.D2.8	Explain and justify the order of presentation of various trial exhibits
7187.D2.9	Critique various types of technology available to assist with the litigation process

Paralegal Studies Capstone	
Career Cluster	Public Service & Safety
Program of Study	Paralegal Studies
NLPS Sequence	D
Course Code	7227
Course Description	*A core component of Paralegal Studies Capstone is a study of Indiana Trial Rules pertaining to an actual trial. Topics include the discovery process and discovery tools, litigation support – including organization and retrieval of trial documents – techniques in preparing witnesses for trial and preparing jury instructions. The main project is compiling a trial notebook. Students will also receive instruction regarding a variety of different hardware and software programs used in general office settings, as well as those used specifically in legal practice. Students will obtain an understanding of the sources of technology used in litigation in the courtroom. Additionally, students will be introduced to the concept of word processing systems and will be offered hands-on experience in the operation of Microsoft Word. Students are required to demonstrate course objectives through the appropriate Microsoft certification examination.*

Prerequisite(s)/ Corequisite(s)	Principles of Paralegal Studies; Paralegal Fundamentals; Advanced Paralegal Studies	
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● No License Available	
Rules 2002	● No License Available	
REPA/REPA 3	● CTE: Trade & Industrial: Legal/Law Professionals 5-12 ● Workplace Specialist: Legal/Law Processionals 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	LEGS 224: Legal Writing II; LEGS 155: Law Office Technology	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	TC Paralegal Studies (22.0302)	
Liberal Arts/Sciences Requirements	ENGL 111: English Composition; IVYT 116: Student Success in Public Service	
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Legal Writing II***	
7227.D1.1	Apply basic grammar and rules to the technique of legal writing.	
7227.D1.2	Prepare a variety of types of correspondence, including but not limited to status letters, opinion letters, appointment letters, engagement letters, cover letters, demand letters, or general client correspondence.	

7227.D1.3	Prepare a variety of types of pleadings, including but not limited to complaints, answers, counterclaims, crossclaims, or replies.
7227.D1.4	Prepare a variety of types of motions.
7227.D1.5	Prepare a variety of types of transactional documents, including but not limited to: contracts, wills, purchase agreements, settlement agreements, or deeds.
7227.D1.6	Prepare a variety of interoffice documents, including but not limited to legal memoranda, interoffice memoranda, or case briefs.
7227.D1.7	Prepare a variety of discovery documents.
7227.D1.8	Demonstrate the difference between predictive (objective) and persuasive legal writing.
7227.D1.9	Demonstrate and use proper legal citations.
Domain	***Law Office Technology***
7227.D2.1	Demonstrate the ability to use legal-specific, office suite and general office technology software including, but not limited to: • Operate practice management software • Operate case management software. • Demonstrate understanding of electronic discovery and operate electronic discovery software. • Operate trial management and presentation software. • Operate calendaring, billing, and time tracking software. Operate document management software.
7227.D2.2	Examine the various ethical duties and responsibilities in using technology involving electronic communication, both within the office and outside the office.
7227.D2.3	Discuss statutes of limitations and their relevance as applies to law office management.
7227.D2.4	Explain Federal and state electronic filing requirements and methods.

Supply Chain & Transportation

Introduction to Transportation		
Career Cluster	Supply Chain & Transportation	
Program of Study		
NLPS Sequence	Introductory	
Course Code	4798	
Course Description	*Introduction to Transportation is an introductory course designed to help students become familiar with fundamental principles in modes of land, sea, air, and space transportation, including basic mechanical skills and processes involved in transportation of people, cargo, and goods. Students will gain and apply knowledge and skills in the safe application, design, production, and assessment of products, services, and systems as it relates to the transportation industries. Content of this course includes the study of how transportation impacts individuals, society, and the environment. This course allows students to reinforce, apply, and transfer their academic knowledge and skills to a variety of interesting and relevant transportation related activities, problems, and settings.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	1 or 2 semester course, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status		
Additional Notes	When offered as applied: 2 units maximum; counts as an employability applied unit for alternate diploma. **Note**: This course qualifies for funding at the 8th grade level	
ADDITIONAL COURSE INFO		
Funding	Introductory	Available for 8th grade
Bulletin 400	● Industrial Arts 7-12, K12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway	
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Student Organizations***
4798.D8.1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
4798.D8.2	Explain the benefits and responsibilities of being a member of a CTSO.
4798.D8.3	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
4798.D8.4	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.
Domain	***Exploring Careers***
4798.D9.1	Use supporting evidence from multiple sources such as job postings and workforce data, to examine and describe careers in the career cluster and identify the roles and responsibilities of each.
4798.D9.2	Evaluate resources that keep workers current in career-related knowledge and technology for careers within the career cluster
4798.D9.3	Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills
4798.D9.4	Demonstrate the qualities, attributes, and skills necessary to succeed in, or further prepare for a chosen career while effectively contributing to society
4798.D9.5	Complete one or more career cluster aptitude surveys, analyze the results, and examine how personal career aptitudes align with careers in a field or pathway of interest
4798.D9.6	Distinguish differences among careers within the career cluster and identify trends related to at least five careers/pathways.
4798.D9.7	Explain opportunities, benefits, and risks of entrepreneurial career pathways in the career cluster
Domain	***History of Transportation***
4798.D1.1	Students validate the historical, current, and future importance of transportation technology

4798.D1.2	Identify and describe different modes of transportation
4798.D1.3	Explore the history of transportation and technical progression
4798.D1.4	Describe technology as it is applied in the context of transportation
4798.D1.5	Identify and evaluate the impact of transportation on daily life
4798.D1.6	Identify major events in the history of the United States that impacted transportation
4798.D1.7	Investigate how historic events changed the course of technological advancement in different modes of transportation
4798.D1.8	Describe the emerging technologies in the transportation industry and how transportation will evolve
Domain	***Transportation Technology***
4798.D2.1	Students analyze technical components in a transportation system that must be considered when designing and using any form of transportation.
4798.D2.2	Examine basic vehicle structural and suspension principles as they relate to performance in different modes of transportation
4798.D2.3	Examine how a vehicle is controlled and guided in each of the modes of transportation
4798.D2.4	Identify support systems that are necessary for transportation systems to effectively work
4798.D2.5	Explain the interaction and operation of different internal components in various land, air, and sea vehicles
4798.D2.6	Explore how interrelated systems make the vehicle move through their different environments
4798.D2.7	Students evaluate basic operations and physical principles used in all forms of land, air, space, and water transportation.
4798.D2.8	Examine Basic Engine Operations of all modes of transportation
4798.D2.9	Differentiate between Basic Engine Classifications
4798.D2.10	Identify different types of power used to propel a vehicular system
4798.D2.11	Examine Basic Principles of Electricity
4798.D2.12	Explain the transfer of power from the source to actual movement
4798.D2.13	Interpret scientific principles in the design of vehicles for each mode of transportation
Domain	***Transportation Design***
4798.D3.1	Students choose appropriate technical, design and engineering processes used to create different modes of transportation.
4798.D3.2	Identify appropriate materials used in designing transportation systems
4798.D3.3	Describe the engineering involved in designing the parts of a transportation system
4798.D3.4	Identify the use of standardized parts in the transportation systems
4798.D3.5	Use different measurement methods using a variety of tools
4798.D3.6	Examine how automotive systems help minimize emissions, control engine temperature, and keep occupants safe
4798.D3.7	Compare how mechanical, fluid, and alternative systems work as related to systems in a transportation vehicle

4798.D3.8	Identify and apply math and science principles as related to the appropriate transportation system
4798.D3.9	Examine safety features of a vehicular system
Domain	***Working Safe***
4798.D5.1	Students design workplace procedures based on established regulations to promote a safe working environment.
4798.D5.2	Demonstrate appropriate tool safety and shop operations that are common across all the Transportation careers
4798.D5.3	Identify state and national safety regulations for working in a transportation facility
4798.D5.4	Identify the function and application of tools, equipment, and technologies used in transportation systems
4798.D5.5	Practice the proper storage of tools
4798.D5.6	Practice appropriate shop/lab upkeep and maintenance duties
4798.D5.7	Practice safety procedures for handling and disposal of hazardous materials
4798.D5.8	Practice safety procedures in cases of emergency
4798.D5.9	Choose the appropriate tools to use on particulars systems
Domain	***Transportation and Society***
4798.D6.1	Students analyze the effects transportation has on our world to determine what is the most efficient and effective vehicle for moving people and goods.
4798.D6.2	Examine the possible ways that natural resources could be used to conserve fuel and energy use in various vehicles
4798.D6.3	Analyze the effects transportation has on the environment by both vehicular and support views
4798.D6.4	Differentiate alternate fuel options for all modes of transportation
4798.D6.5	Identify and describe how mass transportation affects society and the environment
4798.D6.6	Appraise the effect of the built support systems for transportation on the environment
Domain	***The Science of Transportation***
4798.D7.1	Students integrate science and math concepts used in vehicles in different modes of transportation to understand the relationships of technology development.
4798.D7.2	Identify and describe Newton's laws of motion as they pertain to each mode of transportation
4798.D7.3	Apply and adapt the basic principles and forces of flight
4798.D7.4	Apply and adapt Archimedes' principle as it pertains to water transportation
4798.D7.5	Apply and adapt the propulsion as it relates to movement of a vehicle
4798.D7.6	Investigate how aerodynamics affects the vehicles in each mode of transportation
4798.D7.7	Explain Bernoulli's principle in transportation modes
4798.D7.8	Identify and describe energy conversion within each transportation system
4798.D7.9	Distinguish the different mathematical principles involved in a transportation system such as mass, volume, horsepower, center of gravity, work, and power

Advanced Career & Technical Education, College Credit: Transportation	
Career Cluster	Supply Chain & Transportation
Program of Study	
NLPS Sequence	
Course Code	6128
Course Description	*Advanced Career and Technical Education, College Credit is a course title covering any CTE advanced course offered for credit by an accredited postsecondary institution through an adjunct agreement with a secondary school. The intent of this course is to allow students to earn college credit for courses with content that goes beyond that currently approved for high school credit. This course may be used for any dual enrollment course, including a joint program of study involving a postsecondary partnership.*
Prerequisite(s)/ Corequisite(s)	None Recommended: CTE courses that would help prepare the student for success in this area
Credits	1 semester course, up to 3 credits per semester, may be offered for successive semesters up to 12 credits
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X
Additional Notes	A student should earn at least 3 postsecondary credits for each high school credit. Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE funding.
ADDITIONAL COURSE INFO	
Funding	Pilot
Bulletin 400	● Industrial Arts 7- 12, K-12 ● Appropriate Vocational license
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway ● Appropriate Vocational license
Rules 2002	● Technology Education with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	

Four Yr. Course Alignment	
Postsecondary Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**

Transportation: Special Topics	
Career Cluster	Supply Chain & Transportation
Program of Study	
NLPS Sequence	
Course Code	6156
Course Description	*Transportation: Special Topics is an extended learning experience designed to address the advancement and specialization of careers within the career cluster through the provision of a specialized course for a specific workforce need in the school's region. The learning experience is at a qualified site, and is designed to give the student the opportunity to learn and practice technical skills while working under the direction of an appropriately licensed professional. Throughout the course, students will focus on learning about employment opportunities and obtaining the knowledge, skills, and attitudes essential for success in specific occupations. Course standards and curriculum must be tailored to the specific profession, preparing students to advance in this career field, and where applicable, provide students with opportunities for certification or dual credit. Participation in a related CTSO encourages the development of leadership, communication and career related skills, and opportunities for community service.*
Prerequisite(s)/ Corequisite(s)	None
Credits	1 semester course, up to 3 credits per semester, may be offered for successive semesters up to 12 credits
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X
Additional Notes	Schools must have an approved Nonstandard Course Waiver on file to be eligible for CTE funding

ADDITIONAL COURSE INFO		
Funding	Pilot	
Bulletin 400	● Industrial Arts 7- 12, K-12 ● Appropriate Vocational license	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway ● Appropriate Vocational license	
Rules 2002	● Technology Education with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license	
REPA/REPA 3	● Technology Education 5-12 ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential		
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain		

Supply Chain & Transportation Automotive Collision Repair							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7215	Principles of Collision Repair	7204	Automotive Body Repair	7206	Plastic Body Repair and Painting Fundamentals	7380	Collision Repair Capstone

Principles of Collision Repair		
Career Cluster	Supply Chain & Transportation	
Program of Study	Auto Collision Repair	
NLPS Sequence	A	
Course Code	7215	
Course Description	*Principles of Collision Repair provides students an overview of the operating, electrical, and general maintenance systems of the modern automobile. Students will be introduced to the safety and operation of equipment and tools used in the automotive collision industry. Students will study the basics of collision repair, along with learning to perform basic service and maintenance including the car's starting and charging system.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Body & Fender Repair 9-12 ● Occupational Specialist I, II or III: Body & Fender Repair 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Automotive Collision Repair Technology ● Workplace Specialist: Automotive Collision Repair Technology	
REPA/REPA 3	● Technology Education 5-12	

	● CTE: Trade & Industrial Automotive Collision Repair 5-12 ● Workplace Specialist: Automotive Collision Repair 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AUBR 100: Introduction to Collision Service; AUTI 111: Electrical Systems I
VU Course Alignment	AUTO 105: Transportation Fundamentals
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Collision Repair (47.0603), TC Auto Body Technology (47.0603) VU - CG Auto Body Repair (47.0603); A.S. Automotive Technology (47.0604)
Liberal Arts/Sciences Requirements	
Promoted Certifications	ASE A-6 Electrical/Electronic System

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Collision Repair***
7215.D1.1	Identify proper shop safety practices while in the labs.
7215.D1.2	Identify tools & fasteners used in automotive repair.
7215.D1.3	Identify and explain how the automotive collision industry is structured.
7215.D1.4	Identify and explain operation of the 8 major systems of the automobile.
7215.D1.5	Identify and explain what EPA, CAFÉ and NHTSA regulations are and how they affect the automotive industry.
7215.D1.6	Identify and perform basic service and maintenance procedures.
7215.D1.7	Attain readiness to be certified to use an industry standard scanner, like Shop Key Pro exam.
7215.D1.8	Attain readiness to take industry standard safety and pollution prevention certification exams.
7215.D1.9	Attain readiness to take required environmental regulatory exams.
7215.D1.10	Attain readiness to take ICAR Pro Level I Non-Structural and Refinish Certification exam
Domain	***Basic Automotive Electrical***
7215.D2.1	Demonstrate safe shop practices while working with electrical systems.
7215.D2.2	Describe the basic laws of electricity and circuit construction.
7215.D2.3	Identify Electrical symbols and components.
7215.D2.4	Calculate resistance, current, and voltage problems using Ohms Laws.
7215.D2.5	Perform voltage, current, and resistance measurements using the proper measurement devices.
7215.D2.6	Perform voltage drop testing on multiplex and non-multiplex circuits.
7215.D2.7	Perform basic battery testing and diagnosis.
7215.D2.8	Identify starting and charging system components and circuits.
7215.D2.9	Diagnose starting and charging system faults.
7215.D2.10	Attain readiness to take Snap On 504 Multi-meter exam.
Domain	***Career Navigation***

7215.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7215.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7215.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7215.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7215.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7215.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7215.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7215.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7215.D5.1	Demonstrate computer literacy skills and basic computer functions.
7215.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7215.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7215.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Automotive Body Repair	
Career Cluster	Supply Chain & Transportation
Program of Study	Auto Collision Repair
NLPS Sequence	B
Course Code	7204
Course Description	*Automotive Body Repair provides students with an understanding of the materials, measuring, welding, and information resources applicable to collision repair. Students will study steel and aluminum dent repair, including the welding practices commonly performed within an automotive repair environment. Basic skills and knowledge in oxy-fuel welding, cutting, brazing and plasma cutting, gas metal arc welding, squeeze type resistance welding, exterior panel welding and I-CAR welding test preparation will be gained. Students will also learn the installation of moldings, ornaments, and fasteners with emphasis on sheet metal analysis and safety.*
Prerequisite(s)/ Corequisite(s)	Principles of Collision Repair

Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Body & Fender Repair 9-12 ● Occupational Specialist I, II or III: Body & Fender Repair 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Automotive Collision Repair Technology ● Workplace Specialist: Automotive Collision Repair Technology	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Automotive Collision Repair 5-12 ● Workplace Specialist: Automotive Collision Repair 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	AUBR 101: Body Repair I ; AUBR 125: Automotive Body Welding	
VU Course Alignment	BODY 100/100L (Lab): Non-Structural Analysis and Damage Repair/Non-Structural Analysis and Damage Repair Laboratory VU-EC – WELD 185: Automotive Welding	
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Collision Repair (47.0603), TC Auto Body Technology (47.0603) VU/EC - CG Auto Body Repair (47.0603); A.S. Collision Repair and Refinishing (47.0603)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	ASE Non-structural Analysis and Damage Repair	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Metal Body Repair***	
7204.D1.1	Demonstrate proper shop safety practices while in the lab(s). This includes always wearing safety glasses (goggles) while in the lab(s).	
7204.D1.2	Define and describe different types of metals. This includes the identification of the various types of metals used on automobiles.	
7204.D1.3	Gauge metals. This includes the proper use of specific measuring tools used to gauge metals.	

7204.D1.4	Remove and install moldings and ornaments. This includes the proper removal, installation, inspection, and replacement (if necessary) of moldings and ornaments.
7204.D1.5	Identify fasteners and their use. This includes all the various fasteners used on the automobile to attach a variety of body panels and pieces to the body and/or frame of the vehicle.
7204.D1.6	Use and identify hand and power tools. This includes safely and properly using the tools.
7204.D1.7	This also includes proper storing and oiling of air tools
7204.D1.8	Perform minor damage repair. This includes properly mixing and applying body filler (bondo), sanding, priming, etc. in order to prepare the surface for painting.
Domain	***Automotive Welding***
7204.D2.1	Demonstrate the proper safety procedures in oxy-fuel, gas metal arc welding, plasma cutting, squeeze type resistance and exterior panel welding.
7204.D2.2	Set up and shut down an oxy-fuel station properly and safely.
7204.D2.3	Perform soldering and brazing with oxy-fuel equipment.
7204.D2.4	Perform square cut, bevel cut, and hole cut with hand-held oxyfuel cutting torch and plasma cutting equipment.
7204.D2.5	Weld butt, lap and tee joints in the vertical and overhead positions with GMAW.
7204.D2.6	Perform welds with a squeeze type resistance welder.
7204.D2.7	Perform the replacement of body panels, both in steel and plastic parts.
7204.D2.8	Perform all welds necessary for I-CAR welder qualification.
7204.D2.9	Attain readiness to take ICAR Steel Welding Certification exam.

Plastic Body Repair and Paint Fundamentals		
Career Cluster	Supply Chain & Transportation	
Program of Study	Auto Collision Repair	
NLPS Sequence	C	
Course Code	7206	
Course Description	*Plastic Body Repair and Paint Fundamentals introduces the types of fiberglass and plastic materials used in auto body repair and considerations for automotive painting. Students will explore methods for repairing fiberglass and plastic damage, like welding, reinforcing, repairing holes, and retexturing plastic. Students will be asked to demonstrate the proper use of primers and sealers, spraying techniques, and an understanding of various paint finishes.*	
Prerequisite(s)/ Corequisite(s)	Principles of Collision Repair; Automotive Body Repair	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I

Bulletin 400	● Industrial Arts 7-12, K-12
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Body & Fender Repair 9-12 ● Occupational Specialist I, II or III: Body & Fender Repair 9-12
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Automotive Collision Repair Technology ● Workplace Specialist: Automotive Collision Repair Technology
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Automotive Collision Repair 5-12 ● Workplace Specialist: Automotive Collision Repair 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AUBR 103: Automotive Paint Fundamentals; AUBR 220: Fiberglass Plastic Repair
VU Course Alignment	BODY 100/100L (Lab): Non-Structural Analysis and Damage Repair/Non-Structural Analysis and Damage Repair Laboratory▼
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Collision Repair (47.0603), TC Auto Body Technology (47.0603) VU - CG Auto Body Repair (47.0603); A.S. Collision Repair and Refinishing (47.0603)
Liberal Arts/Sciences Requirements	
Promoted Certifications	ASE Painting and Refinishing
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Fiberglass and Plastic Body Repair***
7206-D1.1	Demonstrate proper shop safety practices while in the lab(s). This includes always wearing safety glasses while in the lab(s).
7206-D1.2	Define hazards and safety of materials. This includes proper handling, storing and use of materials and chemicals used.
7206-D1.3	Select tools and equipment. This includes selecting and properly using tools and equipment for the job.
7206-D1.4	Describe use of composite material.
7206-D1.5	Identify different types of damage.
7206-D1.6	Select related material in composite repair.
7206-D1.7	Repair fiberglass and plastic damage. This includes several methods such as welding, reinforcing, repairing holes and retexturing plastics.
Domain	***Paint Fundamentals***
7206-D2.1	Define and demonstrate metal conditioners as they relate to the different metals
7206-D2.2	Demonstrate use of primers and sealers according to their uses (per manufacturer's

	specifications) as a base for final finishes. This includes the proper mixing and application of both primers and sealers.
7206-D2.3	Discuss and know the difference between enamel, urethane, and lacquer finishes and their applications.
7206-D2.4	Determine the proper amount of paint needed for a specific job.
7206-D2.5	Select the proper type of thinner or reducer needed for a specific job.
7206-D2.6	Demonstrate proper spraying techniques using production type equipment for spraying
7206-D2.7	lacquer and enamel finishes.
7206-D2.8	Demonstrate the proper use and application of base coat/clear coat systems.
7206-D2.9	Clean and maintain spray equipment to remove excess materials remaining after spraying.
7206-D2.10	Properly and safely handle, store, and remove toxic body shop materials.

Collision Repair Capstone		
Career Cluster	Supply Chain & Transportation	
Program of Study	Auto Collision Repair	
NLPS Sequence	D	
Course Code	7380	
Course Description	*Collision Repair Capstone further explores important skills and competencies within the Automotive Body Technology Pathway. Topics such as automotive painting technology, collision damage appraising, and fiberglass plastic repair. Additionally, Co-Op and Internship opportunities will be available for students.*	
Prerequisite(s)/ Corequisite(s)	Principles of Collision Repair; Plastic Body Repair and Paint Fundamentals; Automotive Body Repair	
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Industrial Arts 7-12, K-12	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Body & Fender Repair 9-12 ● Occupational Specialist I, II or III: Body & Fender Repair 9-12	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Automotive Collision Repair Technology ● Workplace Specialist: Automotive Collision Repair Technology	

REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Automotive Collision Repair 5-12 ● Workplace Specialist: Automotive Collision Repair 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AUBR 207: Automotive Painting Technology*; AUBR 206: Body Repair II*; AUBR 209: Collision Damage Appraising
VU Course Alignment	BODY 150/150L (Lab): Painting and Refinishing/Painting and Refinishing Laboratory VU-EC – BODY 280: Automotive Customization and Restoration; BODY 290: Custom Painting and Pin-Striping
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Collision Repair (47.0603), TC Auto Body Technology (47.0603) VU/EC - CG Auto Body Repair (47.0603); A.S. Collision Repair and Refinishing (47.0603)
Liberal Arts/Sciences Requirements	
Promoted Certifications	I – CAR Automotive Collision Repair 1
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Painting and Refinishing***
7380.D1.1	Demonstrate proper shop safety practices while in the lab(s). This includes always wearing safety glasses (goggles) while in the lab(s).
7380.D1.2	Prepare surfaces for refinishing. This includes proper mixing and application of primer as well as sanding, cleaning, masking, etc.
7380.D1.3	Spray Automotive Paint. This includes the knowledge of how to properly set up, use, clean and maintain a spray gun and its related equipment (i.e., air hoses, air source(s), air lines, etc.).
7380.D1.4	Spot Refinishing. This includes properly matching paint colors and types in order to apply paint to one area of the automobile so that there is no evidence of the repair.
7380.D1.5	Tint and Blend Colors. This includes being able to properly match paint color and type of that already on the vehicle. This also includes the ability to blend paint while applying it to the vehicle.
7380.D1.6	Compound (buff), polish and clean up the job. This includes buffing and polishing the vehicle after wet sanding to remove any defects and bring out paint shine. This also includes cleaning body openings (door jambs, edges, etc.) as well as the entire exterior to make the vehicle deliverable to its owner after repairs are completed.
Domain	***Collision Damage Appraising***
7380.D2.1	Demonstrate proper shop safety practices while in the lab(s). This includes always wearing safety glasses (goggles) while in the lab(s).
7380.D2.2	Inspect and record damage to a damaged vehicle. Diagnose and measure structural damage using various measuring devices.
7380.D2.3	Calculate paint and materials needed. This includes determining the proper type and amount of paint and related materials needed to make the repair.

7380.D2.4	Estimate repairable damage. This includes determining all damage that needs to be repaired or determining if the vehicle is “totaled” or a “total loss”.
7380.D2.5	Record labor times and parts pieces from cash guides on estimate form. Calculate data on estimate form.
7380.D2.6	Demonstrate proper shop safety practices while in the lab(s). This includes always wearing safety glasses (goggles) while in the lab(s).
Domain	***Metalwork and Filler***
7380.D3.1	Perform metal straightening and filling metals. This includes heat or cold shrinking of stretched metal panels, mixing, and applying body filler (Bondo) while shaping during curing as well as rough sanding cured body filler to contour and then finish sanding.
7380.D3.2	Remove dents in body panels. This includes properly repairing, filling, etc. dents as well as sanding the filler to the contour of the vehicle.
7380.D3.3	Demonstrate body-filling techniques. This includes mixing, proper application and sanding of body filler.
7380.D3.4	Select proper tools and materials needed to repair damaged sheet metal. This includes knowing what each tool is for and how to properly use it.

2025-2026 Next Level Programs of Study

Review Document

Supply Chain & Transportation Automotive Services							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7213	Principles of Automotive Services	7205	Brake Systems	7212	Steering and Suspensions	7375	Automotive Service Capstone

Principles of Automotive Services		
Career Cluster	Supply Chain & Transportation	
Program of Study	Automotive Services	
NLPS Sequence	A	
Course Code	7213	
Course Description	*Principles of Automotive Services gives students an overview of the operating and general maintenance systems of the modern automobile. Students will be introduced to the safety and operation of equipment and tools used in the automotive industry. Students will study the maintenance and light repair of automotive systems. Also, this course gives students an overview of the electrical operating systems of the modern automobile. Students will be introduced to the safety and operation of equipment and tools used in the electrical diagnosis and repair in the automotive electrical industry. Students will study the fundamentals of electricity and automotive electronics.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Auto Mechanics K-12 ● Appropriate Vocational license	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Auto Mechanics 9-12 ● Occupational Specialist I, II or III: Auto Mechanics 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	

	● Appropriate Vocational license
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Automotive Services Technology ● Workplace Specialist: Automotive Services Technology ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Automotive Services 5-12 ● Workplace Specialist: Automotive Services 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AUTI 100: Basic Automotive Service; AUTI 111: Electrical Systems I
VU Course Alignment	AUTO 105 - Transportation Fundamentals; AUTO 110/110L (Lab) - Transportation Electrical/Transportation Electrical Laboratory
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Maintenance and Light Repair (47.0604), TC Automotive Service Technology (47.0604) VU - CG Automotive Service Technology (47.0604); A.S. Automotive Technology (47.0604)
Liberal Arts/Sciences Requirements	
Promoted Certifications	ASE Certification G-1 Any of the following ASE A1-A8; ASE A-6 Electrical/Electronic System
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Maintenance and Light Repair***
7213.D1.1	Identify proper shop safety practices while in the labs.
7213.D1.2	Identify tools & fasteners used in automotive repair.
7213.D1.3	Identify and explain how the automotive repair industry is structured.
7213.D1.4	Identify and explain operation of the 8 major systems of the automobile.
7213.D1.5	Identify and explain what EPA, CAFÉ and NHTSA regulations are and how they affect the automotive industry.
7213.D1.6	Identify and perform basic service and maintenance procedures including tire mounting, balancing, and repair.
7213.D1.7	Attain readiness to be certified to use industry standard diagnostic equipment, like ShopKey Pro.
7213.D1.8	Attain readiness to take SP/2 Mechanical Safety exam.
7213.D1.9	Attain readiness to take SP/2 Pollution Prevention exam.
Domain	***Basic Automotive Electrical***

7213.D2.1	Demonstrate safe shop practices while working with electrical systems.
7213.D2.2	Describe the basic laws of electricity and circuit construction.
7213.D2.3	Identify Electrical symbols and components.
7213.D2.4	Calculate resistance, current, and voltage problems using Ohms Laws.
7213.D2.5	Perform voltage, current, and resistance measurements using the proper measurement devices.
7213.D2.6	Perform voltage drop testing on multiplex and non-multiplex circuits.
7213.D2.7	Perform basic battery testing and diagnosis.
7213.D2.8	Identify starting and charging system components and circuits.
7213.D2.9	Diagnose starting and charging system faults.
7213.D2.10	Attain readiness to be certified to use an industry standard multimeter or fluke meter (e.g. Snap-On EEDM504B4).
Domain	***Additional Competencies***
7213.D3.1	Complete a vehicle inspection.
7213.D3.2	Perform an oil change and demonstrate basic fluid maintenance.
7213.D3.3	Understand fundamentals of the 4-stroke cycle of an internal combustion engine.
Domain	***Career Navigation***
7213.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7213.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7213.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7213.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7213.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7213.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7213.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7213.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7213.D5.1	Demonstrate computer literacy skills and basic computer functions.
7213.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7213.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7213.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Brake Systems		
Career Cluster	Supply Chain & Transportation	
Program of Study	Automotive Services	
NLPS Sequence	B	
Course Code	7205	
Course Description	*Brake Systems teaches theory, service, and repair of automotive braking systems. This course provides an overview of various mechanical brake systems used on today's automobiles. This course will emphasize professional diagnosis and repair methods for brake systems.*	
Prerequisite(s)/ Corequisite(s)	Principles of Automotive Services	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	Schools partnering with Vincennes University must offer the program of study as part of a 2-3 period block	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Auto Mechanics K-12 ● Appropriate Vocational license	
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Auto Mechanics 9-12 ● Occupational Specialist I, II or III: Auto Mechanics 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway ● Appropriate Vocational license	
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Automotive Services Technology ● Workplace Specialist: Automotive Services Technology ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license	
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Automotive Services 5-12 ● Workplace Specialist: Automotive Services 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course	AUTI 121: Brake Systems	

Alignment	
VU Course Alignment	AUTO 120/120L (Lab): Automotive Chassis Systems/Automotive Chassis Systems Laboratory
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Maintenance and Light Repair (47.0604), TC Automotive Service Technology (47.0604) VU - CG Automotive Service Technology (47.0604); A.S. Automotive Technology (47.0604)
Liberal Arts/Sciences Requirements	
Promoted Certifications	ASE A-5 Brakes

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Brake Systems***
7205.D1.1	Demonstrate proper shop safety practices while in the labs.
7205.D1.2	Use and identify tools used to repair brake systems.
7205.D1.3	Explain friction principles and Newton's laws of Motion.
7205.D1.4	Identify and explain operation of braking system components including hydraulic control devices.
7205.D1.5	Perform Disc Brake Inspection and recommend necessary repairs.
7205.D1.6	Perform Drum Brake Inspection and recommend necessary repairs.
7205.D1.7	Adjust parking brakes.
7205.D1.8	Demonstrate resurfacing of drums and rotors including on-car brake lathes.
Domain	***Additional Competencies***
7205.D2.1	Understand anti-lock braking systems and perform diagnostic procedures: Pull ABS trouble codes; Bleeding ant-locking braking systems; How to use the multi-meter
7205.D2.2	Understand driveline service including, differentials, axles, and driveline angles
7205.D2.3	Diagnose if a differential seal is leaking.

Steering and Suspensions	
Career Cluster	Supply Chain & Transportation
Program of Study	Automotive Services
NLPS Sequence	C
Course Code	7212
Course Description	*Steering and Suspensions will cover driveline theory and in-car service procedures. Theory and overhaul procedures related to the driveshaft and axle assemblies for front and rear wheel drive vehicles are included as well. Additionally, the course teaches theory, service and repair of automotive steering, and suspension systems. It provides an overview of various*

	mechanical, power, and electrical steering and suspension systems used on today's automobiles and will emphasize professional diagnosis and repair methods for steering and suspension systems.
Prerequisite(s)/ Corequisite(s)	Principles of Automotive Services; Brake Systems
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	Schools partnering with Vincennes University must offer the program of study as part of a 2-3 period block
ADDITIONAL COURSE INFO	
Funding	High Value | Level I
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Auto Mechanics K-12 ● Appropriate Vocational license
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Auto Mechanics 9-12 ● Occupational Specialist I, II or III: Auto Mechanics 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway ● Appropriate Vocational license
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Automotive Services Technology ● Workplace Specialist: Automotive Services Technology ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Automotive Services 5-12 ● Workplace Specialist: Automotive Services 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AUTI 122: Steering and Suspension Systems; AUTI 145: Driveline Service
VU Course Alignment	AUTO 120/120L (Lab): Automotive Chassis Systems/Automotive Chassis Systems Laboratory
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Maintenance and Light Repair (47.0604), TC Automotive Service Technology (47.0604)

	VU - CG Automotive Service Technology (47.0604); A.S. Automotive Technology (47.0604)
Liberal Arts/Sciences Requirements	
Promoted Certifications	ASE A-4 Steering and Suspension

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Steering and Suspensions***
7212.D1.1	Demonstrate proper shop safety practices while in the labs.
7212.D1.2	Identify tools used for steering and suspension repair.
7212.D1.3	Diagnose steering and suspension concerns and determine worn/defective components.
7212.D1.4	Remove, inspect and service or replace front or rear wheel bearings.
7212.D1.5	Inspect, rotate, mount and balance tires.
7212.D1.6	Diagnose abnormal tire pull and drifting/pulling concerns.
7212.D1.7	Perform Pre-Alignment inspections.
7212.D1.8	Perform 4-wheel alignments.
Domain	***Driveline***
7212.D2.1	Demonstrate safe shop practices and work habits while working with driveline equipment and lifts.
7212.D2.2	Demonstrate usage of tools for driveline diagnosis and repair.
7212.D2.3	Describe basic power flow of the vehicle driveline.
7212.D2.4	Identify correct fluids for manual and automatic transmissions and drive axles.
7212.D2.5	Inspect for sources of leaks.
7212.D2.6	Remove and Replace drive axle bearings, axle shafts, seals, and wheel studs.
7212.D2.7	Remove and replace universal joints, yokes, and shafts.
7212.D2.8	Remove and replace and/or repair constant velocity joints and/ or half-shafts.
7212.D2.9	Locate specifications for drivelines from repair databases.
Domain	***Additional Competencies***
7212.D3.1	Demonstrate operation of a scan tool.
7212.D3.2	Understand, hybrid automotive systems and alternative fuels.
7212.D3.3	Understand drive trains, manual transmissions, and auto SIR systems.

Automotive Service Capstone	
Career Cluster	Supply Chain & Transportation
Program of Study	Automotive Services
NLPS Sequence	D
Course Code	7375
Course Description	*Automotive Service Capstone further explores important skills and competencies within the Automotive Service Technology Pathway. Students will be exposed to an in-depth study of vehicle electrical systems. The course will cover the fundamentals of electricity and*

	automotive electronics in various automotive systems. Students will understand other topics such as engine repair, climate control, and driveline service. Additionally, Co-Op and Internship opportunities will be available for students.
Prerequisite(s)/ Corequisite(s)	Principles of Automotive Services; Brake Systems; Steering and Suspensions
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	
ADDITIONAL COURSE INFO	
Funding	High Value | Level II
Bulletin 400	● Industrial Arts 7-12, K-12 ● Standard Trade & Industrial: Auto Mechanics K-12 ● Appropriate Vocational license
Rules 46-47	● Industrial Technology K-12 ● Industrial Education K-12 ● Standard Trade & Industrial: Auto Mechanics 9-12 ● Occupational Specialist I, II or III: Auto Mechanics 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway ● Appropriate Vocational license
Rules 2002	● Technology Education with high school setting ● CTE: Trade & Industrial: Automotive Services Technology ● Workplace Specialist: Automotive Services Technology ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license
REPA/REPA 3	● Technology Education 5-12 ● CTE: Trade & Industrial Automotive Services 5-12 ● Workplace Specialist: Automotive Services 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway ● Appropriate CTE license
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AUTI 142: Climate Control Systems*; AUTI 112: Electrical Systems II*; AUTI 132: Engine Performance Systems II*; AUTI 131: Engine Performance Systems I; AUTI 141: Engine Fundamentals and Repair
VU Course Alignment	VU-EC - AUTO 130/130L (Lab): Automotive Engine Systems/Automotive Engine Systems Laboratory▼
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Maintenance and Light Repair (47.0604), TC Automotive Service Technology (47.0604)

	VU-EC - CG Automotive Service Technology (47.0604); A.S. Automotive Technology (47.0604)
Liberal Arts/Sciences Requirements	
Promoted Certifications	ASE A-1 Engine repair; ASE A-7 Heating and Air; ASE A-8 Engine Performance and ASE A-6 Electrical Systems

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Engine Performance and Repair***
7375.D1.1	Demonstrate proper shop safety practices while in the labs.
7375.D1.2	Explain four-stroke cycle fundamentals and volumetric efficiency.
7375.D1.3	Identify and explain the operation of fuel injection systems.
7375.D1.4	Identify and explain operation of ignition systems.
7375.D1.5	Identify and explain operation of vehicle emission systems.
7375.D1.6	Identify and explain operation of sensors and actuators.
7375.D1.7	Retrieve DTCs and freeze frame data with a scan tool.
7375.D1.8	Diagnose fuel and ignition faults.
7375.D1.9	Describe the major engine operating systems and their function. Identify engine configurations.
7375.D1.10	Demonstrate basic engine diagnosis including compression and leak down testing.
Domain	***Engine Performance Systems***
7375.D2.1	Demonstrate knowledge of computer sensors and inputs.
7375.D2.2	Demonstrate knowledge of computer actuators and outputs.
7375.D2.3	Diagnose inputs and outputs.
7375.D2.4	Describe the function of the OBD II Monitors.
7375.D2.5	Diagnose OBD II system fault codes and determine repair needed.
7375.D2.6	Determine if OBD II monitors have executed.
7375.D2.7	Attain readiness to take the VERUS Navigation and Scanner Certification exam.
Domain	***Engine Fundamentals***
7375.D3.1	Identify tools used for common engine repair.
7375.D3.2	Describe the major engine operating systems and their function.
7375.D3.3	Identify engine configurations.
7375.D3.4	Describe engine components and their functions.
7375.D3.5	Describe engine lubricants and sealing systems.
7375.D3.6	Demonstrate use of precision measuring equipment.
7375.D3.7	Describe fasteners and torque requirements and procedures.
7375.D3.8	Inspect cylinder long block components and determine needed repairs.
7375.D3.9	Properly install camshaft and timing chain(s) and /or belts.
7375.D3.10	Disassemble and reassemble engines to industry standards.
7375.D3.11	R & R engine assembly.
7375.D3.12	Attain readiness to take Snap on Torque Electrical Certification exam.
7375.D3.13	Attain readiness to take Snap on Torque Mechanical Certification exam.
Domain	***Electrical Systems***

7375.D4.1	Describe and explain analog and digital signals.
7375.D4.2	Explain and diagnose body modules and their function.
7375.D4.3	Demonstrate knowledge of wiring and circuit diagrams.
7375.D4.4	Demonstrate knowledge of voltage, current, and resistance measurements using meters and scopes.
7375.D4.5	Diagnose service and repair electrical/electronic system faults.
7375.D4.6	Demonstrate the ability to diagnose automotive circuits using electrical schematics.
7375.D4.7	Explain Hybrid Electrical systems and their operation.
7375.D4.8	Explain/demonstrate Hybrid vehicle service safety precautions.
7375.D4.9	Explain and diagnose advanced automotive systems and networks.
7375.D4.10	Utilize scan tools, lab scopes, and other electronic diagnostic equipment.
Domain	***Climate Control***
7375.D5.1	Demonstrate proper handling of refrigerants.
7375.D5.2	Identify tools and equipment used in climate control systems.
7375.D5.3	Identify all components of the heating and air conditioning system.
7375.D5.4	Explain the purpose and function of the heating and air conditioning systems.
7375.D5.5	Explain refrigeration theory.
7375.D5.6	Diagnose service and repair heating and air conditioning components.
7375.D5.7	Recover and recycle refrigerants using approved equipment.
7375.D5.8	Demonstrate knowledge of automatic climate control systems.
7375.D5.9	Diagnose automatic and manual climate control systems.
7375.D5.10	Explain hybrid climate control system operation.

Supply Chain & Transportation Aviation Maintenance							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7372	Principles of Aviation Maintenance	7374	Aviation Maintenance Fundamentals	7376	Advanced Aviation Maintenance	7378	Aviation Maintenance Capstone

Principles of Aviation Maintenance		
Career Cluster	Supply Chain & Transportation	
Program of Study	Aviation Maintenance	
NLPS Sequence	A	
Course Code	7372	
Course Description	*Principles of Aviation Maintenance Regulations provides students with an understanding of Federal Aviation Administration (FAA) regulations as they pertain to aircraft technicians and the maintenance of aircraft. Topics of discussion will include aviation regulations, ground operations, weight and balance, and corrosion control.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	Schools partnering with Vincennes University must offer the program of study as part of a 2-3 period block to meet the contact hour requirements for VU aviation maintenance courses	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Aircraft Operations K-12	
Rules 46-47	● Standard Trade & Industrial: Aircraft Operations 9-12 ● Occupational Specialist I, II or III: Aircraft Operations 9-12	
Rules 2002	● CTE: Trade & Industrial: Aviation Operations ● Workplace Specialist: Aviation Operations	
REPA/REPA 3	● CTE: Trade & Industrial Aviation Operations 5-12 ● Workplace Specialist: Aviation 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course		

Alignment	
VU Course Alignment	AMNT 110/L (Lab): Regulations and Aviation Fundamentals*
Four Yr. Course Alignment	
Postsecondary Credential	Aviation Maintenance Technology – Airframe Certificate C.G. (47.0607)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Mathematics***
	Demonstrates understanding of:
7372.D1.1	Basic mathematic functions (addition, subtraction, multiplication, division).
7372.D1.2	Rounding numbers
7372.D1.3	Ratio problems, including examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
7372.D1.4	Proportion and percentage problems, including examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
7372.D1.5	Use of positive and negative integers in mathematical operations.
7372.D1.6	Powers and special powers.
7372.D1.7	Algebraic operations, including examples of where or how they may be used in relation to aircraft maintenance.
7372.D1.8	Definitions, descriptions, and use of geometrical terms, including but not limited to any of the following: polygon, pi, diameter, radius, and hypotenuse.
7372.D1.9	Areas of various geometrical shapes.
7372.D1.10	Volumes of various geometrical shapes.
7372.D1.11	Measurement systems.
7372.D1.12	Scientific (exponential) notation, decimal notation, fractional notation, binary notation, and conversion between these various forms of numeric notation.
7372.D1.13	Conditions or areas in which metric conversion may be necessary.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7372.D1.14	Rounding off calculations.
7372.D1.15	Use of both positive and negative integers in mathematical operations.
7372.D1.16	Precedence of operations when solving an algebraic equation.
	Skills:
7372.D1.17	Determine the square root of given numbers.
7372.D1.18	Compare two numerical values using ratios.
7372.D1.19	Compute the area of a wing.
7372.D1.20	Calculate the volume of a shape, such as a baggage compartment or fuel tank.
7372.D1.21	Compute the volume of a cylinder.

7372.D1.22	Compute compression ratio.
7372.D1.23	Compute the torque value when converting from inch-pounds to foot-pounds or from foot-pounds to inch-pounds.
7372.D1.24	Convert between fractional and decimal numbers.
Domain	***Physics of Aviation***
	Demonstrates understanding of:
7372.D2.1	Matter and energy.
7372.D2.2	Relationship between temperature, density, weight, and volume.
7372.D2.3	Work, power, force, and motion.
7372.D2.4	Force, area, or pressure in a specific application.
7372.D2.5	Simple machines and mechanics.
7372.D2.6	Newton's Law of Motion.
7372.D2.7	Heat and pressure.
7372.D2.8	Gas law and fluid mechanics.
7372.D2.9	Bernoulli's Principle.
7372.D2.10	Standard atmosphere and factors affecting atmospheric conditions.
7372.D2.11	Theory of flight (aerodynamics).
7372.D2.12	Primary and secondary aircraft flight controls.
7372.D2.13	Additional aerodynamic devices, including vortex generators, wing fences, and stall strips.
Domain	**Demonstrates ability to identify, assess, and mitigate risks associated with:**
7372.D3.1	Use of related units of measure (e.g., Celsius vs. Fahrenheit).
7372.D3.2	Changes in aircraft and engine performance due to density altitude.
7372.D3.3	Effect a repair can have on a flight surface.
7372.D3.4	Use of performance/testing data.
	Skills:
7372.D3.5	Calculate force, area, or pressure in a specific application.
7372.D3.6	Calculate horsepower.
7372.D3.7	Identify changes in pressure and velocity as a fluid passes through a venturi.
7372.D3.8	Demonstrate the mechanical advantage of various types of levers.
7372.D3.9	Design an inclined plane on paper, indicating the mechanical advantage.
7372.D3.10	Convert temperature units (e.g., from Celsius to Fahrenheit).
7372.D3.11	Determine density altitude.
7372.D3.12	Determine pressure altitude.
Domain	***Regulations, Maintenance Forms, Records, and Publications***
	Demonstrates understanding of:
7372.D3.13	The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics.
7372.D3.14	Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD).
7372.D3.15	Alternative Method of Compliance (AMOC) for an AD.
7372.D3.16	Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.
7372.D3.17	Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair).
7372.D3.18	Usable on (effectivity) codes in parts manuals.

7372.D3.19	Methods used to establish the serial number effectivity of an item.
7372.D3.20	Inoperative equipment.
7372.D3.21	Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals.
7372.D3.22	Compliance requirements for manufacturer-specified methods, techniques, and practices.
7372.D3.23	Maintenance record entry for approval for return to service after maintenance and alterations.
7372.D3.24	The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3).
7372.D3.25	Criteria and responsibility for determining whether a repair or alteration is major or minor.
7372.D3.26	Difference between approved data and acceptable data, and when each is required.
7372.D3.27	FAA databases and resources are available, including TCDSs and supplemental type certificates.
7372.D3.28	FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator.
7372.D3.29	Maintenance record entry for approval for return to service after inspection.
7372.D3.30	Discrepancy records or placards.
7372.D3.31	Compliance requirements for manufacturer-specified maintenance and inspection intervals.
7372.D3.32	FAA-approved airworthiness limitations.
7372.D3.33	Mechanic address change notification procedures.
7372.D3.34	Recent experience requirements and how to re-establish once lost.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7372.D3.35	Adherence to warnings, cautions, or notes in maintenance and operational manuals.
7372.D3.36	Completeness or accuracy of documentation.
7372.D3.37	Complacency during documentation phase of maintenance procedures.
7372.D3.38	Determination of component applicability to a given aircraft. (Parts Catalog)
7372.D3.39	Use of SDS.
	Skills:
7372.D3.40	Locate applicable FAA aircraft specifications and FAA TCDS for an aircraft or component.
7372.D3.41	Determine applicability of an AD.
7372.D3.42	Determine maximum allowable weight of a specific aircraft.
7372.D3.43	Locate supplemental type certificates applicable to a specific aircraft.
7372.D3.44	Explain the difference between “approved data” (required for major repair/alteration) and “acceptable data” (required for minor repair/alteration).
7372.D3.45	Determine applicability of approved data for a major repair.
7372.D3.46	Determine the conformity of aircraft instrument range markings and placarding.
7372.D3.47	Determine approved replacement parts for installation on a given aircraft.
7372.D3.48	Check a Technical Standard Order (TSO) or part manufacturing authorization for the proper markings.
7372.D3.49	Determine whether a given repair or alteration is major or minor.
7372.D3.50	Use a manufacturer’s illustrated parts catalog to locate a specific part number and applicability.
7372.D3.51	Complete an FAA Form 337 for a major repair or alteration.
7372.D3.52	Examine an FAA Form 337 for accuracy.
7372.D3.53	Complete an aircraft maintenance record entry for the compliance of a reoccurring AD for a specific airframe, aircraft engine, appliance, or propeller.

7372.D3.54	Determine whether a given repair or alteration is major or minor.
7372.D3.55	Compare an equipment list for an aircraft to equipment installed.
7372.D3.56	Determine an aircraft's inspection status by reviewing the aircraft's maintenance records.
7372.D3.57	Complete a 100-hour inspection aircraft maintenance record entry.
Domain	***Human Factors***
	Demonstrates understanding of:
7372.D4.1	Human performance and limitations.
7372.D4.2	Human error principles.
7372.D4.3	Safety culture and organizational factors.
7372.D4.4	Teamwork and leadership.
7372.D4.5	Physical and social environment.
7372.D4.6	Shift and task turnover.
7372.D4.7	Communication/reporting of hazards.
7372.D4.8	Types of human errors.
7372.D4.9	Fatigue management and fitness for duty.
7372.D4.10	Professionalism and integrity.
7372.D4.11	Conditions/preconditions for unsafe acts.
7372.D4.12	Event investigation.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7372.D4.13	Selective reporting of hazards.
7372.D4.14	Non-invasive, condition-monitoring technologies.
	Skills:
7372.D4.15	Locate information regarding human factors errors.
7372.D4.16	Brief a shift turnover for continuity of work.
7372.D4.17	File a Malfunction or Defect Report.
Domain	***Career Navigation***
7372.D5.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7372.D5.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7372.D5.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7372.D5.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7372.D6.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7372.D6.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7372.D6.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7372.D6.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7372.D7.1	Demonstrate computer literacy skills and basic computer functions.

7372.D7.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7372.D7.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7372.D7.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Aviation Maintenance Fundamentals		
Career Cluster	Supply Chain & Transportation	
Program of Study	Aviation Maintenance	
NLPS Sequence	B	
Course Code	7374	
Course Description	*Aviation Maintenance Fundamentals provides students with an understanding of aircraft materials and operation. Topics of discussion will include ground operations and servicing, cleaning and corrosion control, and weight and balance. This course will include lab elements that allow students to build necessary skills associated with the above understandings of FAA Maintenance General Section subjects.*	
Prerequisite(s)/ Corequisite(s)	Principles of Aviation Maintenance	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	Schools partnering with Vincennes University must offer the program of study as part of a 2-3 period block in order to meet the contact hour requirements for VU aviation maintenance courses	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Aircraft Operations K-12	
Rules 46-47	● Standard Trade & Industrial: Aircraft Operations 9-12 ● Occupational Specialist I, II or III: Aircraft Operations 9-12	
Rules 2002	● CTE: Trade & Industrial: Aviation Operations ● Workplace Specialist: Aviation Operations	
REPA/REPA 3	● CTE: Trade & Industrial Aviation Operations 5-12 ● Workplace Specialist: Aviation 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		

VU Course Alignment	AMNT 112/112L (Lab): Ground Ops, Corrosion, and Weight and Balance*
Four Yr. Course Alignment	
Postsecondary Credential	Aviation Maintenance Technology – Airframe Certificate C.G. (47.0607)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Ground Operations and Servicing***
	Demonstrates understanding of:
7374.D1.1	Hazardous materials, Safety Data Sheets (SDS), and PPE.
7374.D1.2	Tool and hardware use and accountability.
7374.D1.3	Foreign object damage effects.
7374.D1.4	Types/classes of fire extinguishers and procedures.
7374.D1.5	Aircraft securing procedures.
7374.D1.6	Airport operation area procedures and ATC communications, including runway incursion prevention.
7374.D1.7	Engine starting, ground operation, and aircraft taxiing procedures.
7374.D1.8	Aircraft towing procedures.
7374.D1.9	Aircraft oil, hydraulic and pneumatic, and deciding servicing procedures.
7374.D1.10	Oxygen system servicing procedures.
7374.D1.11	Characteristics of aviation gasoline and turbine fuels, including basic types and means of identification.
7374.D1.12	Use of approved grades/types of fuel in aircraft engines.
7374.D1.13	Fuel additives are commonly used in the field.
7374.D1.14	Aviation fueling/defueling procedures.
7374.D1.15	Material handling.
7374.D1.16	Parts protections.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7374.D1.17	Engine start/run-up without using a checklist.
7374.D1.18	Engine starting and ground operations.
7374.D1.19	Engine starting and operation while troubleshooting or adjusting engine controls.
7374.D1.20	Ground operation of an aircraft engine with cowling removed contrary to manufacturer instructions.
7374.D1.21	Ground operation of aircraft in the vicinity of other aircraft or ground support equipment.
7374.D1.22	Preparing to tow an aircraft.
7374.D1.23	Connecting external power equipment to an aircraft.
7374.D1.24	Oxygen system servicing.
7374.D1.25	Misfuelling and using incorrect or contaminated fuel.

7374.D1.26	Fueling/defueling ungrounded aircraft or using improper equipment.
	Skills:
7374.D1.27	Hazardous materials, Safety Data Sheets (SDS), and PPE.
7374.D1.28	Perform a foreign object damage control procedure.
7374.D1.29	Connect external power to an aircraft.
7374.D1.30	Prepare an aircraft for towing.
7374.D1.31	Use appropriate hand signals for the movement of aircraft.
7374.D1.32	Inspect an aircraft fuel system for water and foreign object debris (FOD) contamination.
7374.D1.33	Identify different grades of aviation fuel.
7374.D1.34	Select an approved fuel for an aircraft.
7374.D1.35	Prepare an aircraft for fueling.
7374.D1.36	Follow a checklist to start up or shut down an aircraft reciprocating or turbine engine.
7374.D1.37	Identify procedures for extinguishing fires in an engine induction system.
7374.D1.38	Secure an aircraft.
7374.D1.39	Locate and explain procedures for securing a turbine-powered aircraft after engine shutdown.
Domain	***Weight and Balance***
	Demonstrates understanding of:
7374.D2.1	Purpose for weighing an aircraft.
7374.D2.2	Purpose and application of weight and CG limits.
7374.D2.3	Purpose of determining CG.
7374.D2.4	Weight and balance terminology.
7374.D2.5	Determine proper empty weight configuration.
7374.D2.6	Weighing procedures, including the general preparations for weighing, with emphasis on aircraft weighing area considerations.
7374.D2.7	Jacking an aircraft.
7374.D2.8	Procedures for calculation of the following: arm, positive or negative moment, center of gravity (CG), or moment index.
7374.D2.9	Adverse loading considerations and how to calculate if adverse loading causes an out-of-limit condition.
7374.D2.10	Proper ballast placement.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7374.D2.11	Aerodynamic effect of CG that is forward or aft of CG limits.
7374.D2.12	Aerodynamic and performance effects of weight in excess of limits.
7374.D2.13	Aircraft weighing procedures.
7374.D2.14	Use of scales.
7374.D2.15	Situations and conditions when jacking an aircraft.
	Skills:
7374.D2.16	Research and explain the procedures for weighing an aircraft.
7374.D2.17	Perform weight and balance calculations.
7374.D2.18	Calculate ballast weight shift and required weight location.
7374.D2.19	Check aircraft weighing scales for calibration.
7374.D2.20	Calculate weight and balance for an aircraft after an equipment change.
7374.D2.21	Compute forward and aft loaded CG limit.
7374.D2.22	Create a maintenance record for a weight and balance change.
7374.D2.23	Compute the empty weight and empty weight CG of an aircraft.

7374.D2.24	Calculate the moment of an item of equipment.
7374.D2.25	Identify tare items.
7374.D2.26	Locate weight and balance information.
7374.D2.27	Locate datum.
7374.D2.28	Locate weight and balance placarding and limitation requirements for an aircraft.
7374.D2.29	Revise an aircraft equipment list after equipment change.
7374.D2.30	Calculate the change needed to correct an out of balance condition.
7374.D2.31	Determine an aircraft's CG range using aircraft specifications, Type Certificate Data Sheets (TCDSs), and aircraft listings.
7374.D2.32	Calculate a weight change and complete required records.
Domain	***Cleaning and Corrosion Control***
	Demonstrates understanding of:
7374.D3.1	Corrosion theory and causation.
7374.D3.2	Types and effects of corrosion.
7374.D3.3	Corrosion preventive maintenance procedures.
7374.D3.4	Corrosion preventive compounds (CPC) (e.g., waxy sealants, thin-film dielectrics).
7374.D3.5	Selection of optimal CPC and frequency of treatment.
7374.D3.6	Use of high-pressure application equipment.
7374.D3.7	Materials used for protection of airframe structures.
7374.D3.8	Corrosion identification and inspection.
7374.D3.9	Corrosion-prone areas in aircraft.
7374.D3.10	Corrosion removal and treatment procedures.
7374.D3.11	Dissimilar metals causing accelerated corrosion and role of protective barriers to mitigate this risk.
7374.D3.12	Conversion coatings.
7374.D3.13	Aircraft cleaning procedures.
7374.D3.14	Improper use of cleaners on aluminum or composite materials.
7374.D3.15	Primer materials.
7374.D3.16	Topcoat materials.
7374.D3.17	Surface preparation for a desired finishing material.
7374.D3.18	Finishing materials application techniques and practices.
7374.D3.19	Effects of ambient conditions on finishing materials.
7374.D3.20	Effects of improper surface preparation on finishing materials.
7374.D3.21	Inspection of aircraft finishes.
7374.D3.22	Regulatory requirements for replacing identification, registration markings, and placards.
7374.D3.23	Safety practices/precautions when using finishing materials (e.g., PPE, fire prevention).
7374.D3.24	Control surface balance considerations after refinishing.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7374.D3.25	Working with flammable chemicals.
7374.D3.26	Identification of materials and processes to be used for cleaning or corrosion treatment on a given part or structure to prevent further damage.
7374.D3.27	SDS PPE instructions for products during removal and treatment of corrosion.
7374.D3.28	Use of PPE when working with paints and solvents.
7374.D3.29	Ventilation.
7374.D3.30	Disposal of chemicals and waste materials.

7374.D3.31	Health concerns when using paints, solvents, finishing materials, and processes.
	Skills:
7374.D3.32	Perform a portion of an aircraft corrosion inspection.
7374.D3.33	Identify, select, and use aircraft corrosion prevention/cleaning materials.
7374.D3.34	Apply corrosion prevention/coating materials.
7374.D3.35	Inspect finishes and identify defects.
7374.D3.36	Inspect an aircraft compartment for corrosion.
7374.D3.37	Identify procedures to clean and protect plastics.
7374.D3.38	Determine location and size requirements for aircraft registration numbers.
7374.D3.39	Prepare composite surface for painting.
7374.D3.40	Identify finishing materials and appropriate thinners.
7374.D3.41	Layout and mask a surface in preparation for painting.
7374.D3.42	Prepare metal surface for painting.
7374.D3.43	Determine what paint system can be used on a given aircraft.
7374.D3.44	Apply etch solution and conversion coating.
7374.D3.45	Identify types of protective finishes.

Advanced Aviation Maintenance		
Career Cluster	Supply Chain & Transportation	
Program of Study	Aviation Maintenance	
NLPS Sequence	C	
Course Code	7376	
Course Description	*Advanced Aviation Maintenance provides students with an understanding of aircraft drawings, electricity, and electronics systems. The course will also explore aircraft materials, hardware, processes, inspection concepts and techniques, and fluid lines and fittings. The course will include lab elements that allow students to build necessary skills associated with the above understandings of FAA Maintenance General Section subjects.*	
Prerequisite(s)/ Corequisite(s)	Principles of Aviation Maintenance; Aviation Maintenance Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	Schools partnering with Vincennes University must offer the program of study as part of a 2-3 period block in order to meet the contact hour requirements for VU aviation maintenance courses	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Aircraft Operations K-12	

Rules 46-47	● Standard Trade & Industrial: Aircraft Operations 9-12 ● Occupational Specialist I, II or III: Aircraft Operations 9-12
Rules 2002	● CTE: Trade & Industrial: Aviation Operations ● Workplace Specialist: Aviation Operations
REPA/REPA 3	● CTE: Trade & Industrial: Aviation Operations 5-12 ● Workplace Specialist: Aviation 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	
VU Course Alignment	AMNT 114/114L (Lab): Basic Electricity and Drawings*; AMNT 116/116L (Lab): Materials, Processes, and Fluid Lines*
Four Yr. Course Alignment	
Postsecondary Credential	Aviation Maintenance Technology – Airframe Certificate C.G. (47.0607)
Liberal Arts/Sciences Requirements	
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Aircraft Drawings***
	Demonstrates understanding of:
7376.D1.1	Drawings, blueprints, sketches, charts, graphs, and system schematics, including commonly used lines, symbols, and terminology.
7376.D1.2	Terms used in conjunction with aircraft drawings, blueprints, or system schematics.
7376.D1.3	Repair or alteration of an aircraft system or component(s) using drawings, blueprints, or system schematics to determine whether it conforms to its type design.
7376.D1.4	Inspection of an aircraft system or component(s) using drawings, blueprints, or system schematics.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7376.D1.5	Interpretation of plus or minus tolerances as depicted on aircraft drawings.
7376.D1.6	Identification of the current version and applicability of drawing being used.
7376.D1.7	Applicability of the drawing or schematic to the particular aircraft by model and serial number.
7376.D1.8	Specifications for design of alterations and repairs.
	Skills:
7376.D1.9	Identify the meaning of lines and symbols used in an aircraft drawing.
7376.D1.10	Interpret dimensions used in an aircraft drawing.
7376.D1.11	Identify changes on an aircraft drawing.
7376.D1.12	Identification of the current version and applicability of drawing being used.
7376.D1.13	Determine material requirements from an aircraft drawing.

7376.D1.14	Interpret graphs and charts.
Domain	***Fundamentals of Electricity and Electronics***
	Demonstrates understanding of:
7376.D2.1	Electrostatic discharge, Magnetism, Voltage, Electron theory (conventional flow vs. electron flow), Current, Electrical circuit drawings.
7376.D2.2	Electrical laws and theory, Ohm's Law, Resistance, Power.
7376.D2.3	Resistor types and color coding.
7376.D2.4	Protective devices, including fuses, circuit breakers, and current limiters.
7376.D2.5	Controlling devices, including switches and relays.
7376.D2.6	Direct current (DC) electrical circuits, Series circuits.
7376.D2.7	Kirchhoff's Laws, Faraday's Law, Lenz's Law, Watt's Law
7376.D2.8	Total resistance, Resistance in series, Parallel circuits, Resistance in parallel.
7376.D2.9	Complex/combined circuits, Capacitance in a circuit, Inductance in a circuit,
7376.D2.10	Alternating current (AC) electrical circuits.
7376.D2.11	Impedance
7376.D2.12	Transformers.
7376.D2.13	Electrical measurement tools, principles, and procedures.
7376.D2.14	Circuit continuity, Aircraft batteries
7376.D2.15	Semiconductors, including diodes, transistors, and integrated circuits.
7376.D2.16	Digital logic, including RAM, ROM, NVRAM, logic gates, inverter, rectifier, and flip flop.
7376.D2.17	Binary numbers, AC and DC motors, Right-hand motor rule, Regulation.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7376.D2.18	Working around batteries
7376.D2.19	Handling, storage, and inspection of different types of batteries (i.e., lead acid, NiCad, lithium ion, gel cell
7376.D2.20	High-voltage circuits (e.g., strobe lighting).
	Skills:
7376.D2.21	Perform circuit continuity test.
7376.D2.22	Measure voltage.
7376.D2.23	Measure current.
7376.D2.24	Measure resistance.
7376.D2.25	Test a switch or relay.
7376.D2.26	Test a fuse or circuit breaker.
7376.D2.27	Read and interpret aircraft electrical circuit diagrams, and symbols, including solid state devices and logic functions.
7376.D2.28	Troubleshoot a circuit.
7376.D2.29	Identify symbols used in electrical and electronic schematic diagrams (e.g., grounds, shields, resistors, capacitors, fuses, circuit breakers, batteries, diodes, transistors, and integrated circuits).
7376.D2.30	Demonstrate how to test for short-circuit and open-circuit conditions.
7376.D2.31	Measure voltage drop across a resistor.
7376.D2.32	Determine or measure for open electrical circuits.
7376.D2.33	Inspect an aircraft battery.
7376.D2.34	Service an aircraft battery.
Domain	***Aircraft Materials, Hardware, and Processes***

	Demonstrates understanding of:
7376.D2.34	Suitability and compatibility of materials and hardware used for maintenance.
7376.D2.35	Materials are commonly used in aircraft and their general application.
7376.D2.36	Forces placed on aircraft materials (e.g., tension, compression, torsion, bending, strain, and shear).
7376.D2.37	Heat treatment and metal working processes.
7376.D2.38	Hardware commonly used in aircraft (e.g., bolts, nuts, screws, pins, washers, turn lock fasteners, cables, cable fittings, and rigid line couplings).
7376.D2.39	Identification markings on materials and hardware.
7376.D2.40	Torquing tools, principles, and procedures.
7376.D2.41	Safety wire and safety clip requirements and techniques.
7376.D2.42	Cable construction and swaging.
7376.D2.43	Precision measurement tools, principles, and procedures.
7376.D2.44	Soldering preparation, types of solder, and flux usage.
7376.D2.45	Characteristics of acceptable welds.
7376.D2.46	Characteristics of unacceptable welds.
7376.D2.47	Procedures for weld repairs.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7376.D2.48	Use of personal protective equipment (PPE).
7376.D2.49	Used hardware or suspected unapproved parts (SUPS).
7376.D2.50	Improper torque.
7376.D2.51	Torquing techniques on critical, highly stressed fasteners.
	Skills:
7376.D2.52	Distinguish between heat-treated and non-heat-treated aluminum alloys.
7376.D2.53	Select the correct aluminum alloy for a structural repair.
7376.D2.54	Identify aircraft materials and hardware based on manufacturer's markings.
7376.D2.55	Determine suitability of materials for aircraft repairs.
7376.D2.56	Select and install aircraft bolts.
7376.D2.57	Identify rivets by physical characteristics.
7376.D2.58	Determine and properly torque aircraft hardware.
7376.D2.59	Install safety wire on nuts, bolts, and turnbuckles.
7376.D2.60	Identify aircraft control cable components.
7376.D2.61	Fabricate a cable assembly using a swaged-end fitting.
7376.D2.62	Inspect and check welds.
7376.D2.63	Check for proper calibration of a micrometer.
7376.D2.64	Check the concentricity of a shaft.
7376.D2.65	Make precision measurements with an instrument that has a Vernier scale.
Domain	***Fluid Lines and Fittings***
	Demonstrates understanding of:
7376.D3.1	Tubing and hose materials, applications, sizes, and fittings.
7376.D3.2	Importance of using a torque wrench when securing fluid hose and line fittings.
7376.D3.3	Rigid line or flexible hose material identification.
7376.D3.4	Use of torque seal or similar witness techniques after installing critical fluid hose and line fittings.
7376.D3.5	Rigid line fabrication, installation, and inspection techniques/practices.

7376.D3.6	Flexible hose fabrication, installation, and inspection techniques/practices.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7376.D3.7	Hazardous fluids.
7376.D3.8	High-pressure fluid systems.
7376.D3.9	Use of required safety equipment.
7376.D3.10	System configuration prior to and during maintenance.
7376.D3.11	A twisted hose.
7376.D3.12	Use of tools while applying torque to a fluid line.
7376.D3.13	A loosened fitting or a hose that has moved out of position.
	Skills:
7376.D3.14	Identify fluid lines, pneumatic lines, and fittings.
7376.D3.15	Perform a rigid line or flexible hose inspection.
7376.D3.16	Fabricate a rigid line with a flare and a bend.
7376.D3.17	Install an aircraft rigid line.
7376.D3.18	Fabricate a flareless-fitting-tube connection.
7376.D3.19	Fabricate a flexible hose.
7376.D3.20	Install an aircraft flexible hose.
Domain	***Inspection Concepts and Techniques***
	Demonstrates understanding of:
7376.D4.1	Measuring tools, including calipers, micrometers, and gauges.
7376.D4.2	Calibration and tool accuracy requirements.
7376.D4.3	Aircraft inspection programs (e.g., progressive, 100-hour, annual, and other FAA-approved inspections).
7376.D4.4	Nondestructive Testing (NDT) procedures and methods.
7376.D4.5	Aircraft inspection methods and tools for materials, hardware, and processes.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7376.D4.6	Using precision measuring instruments.
7376.D4.7	Calibration of precision measuring equipment.
7376.D4.8	Selection of inspection techniques.
7376.D4.9	Demagnetizing a component following a magnetic particle inspection.
7376.D4.10	Damage prevention to aircraft components and test equipment when using an ohmmeter.
	Skills:
7376.D4.11	Use Vernier calipers.
7376.D4.12	Use micrometers.
7376.D4.13	Use measurement gauges.
7376.D4.14	Inspect aircraft for compliance with an AD.
7376.D4.15	Identify NDT methods for composite, surface metal, and subsurface metal defects.
7376.D4.16	Perform a visual inspection.
7376.D4.17	Perform a dye penetrant inspection.
7376.D4.18	Perform a tap test on a composite component.

Aviation Maintenance Capstone		
Career Cluster	Supply Chain & Transportation	
Program of Study	Aviation Maintenance	
NLPS Sequence	D	
Course Code	7378	
Course Description	*The Aviation Maintenance Capstone will explore knowledge and risks elements associated with the FAA airframe section. Topics of discussion will be non-metallic structures, landing gear, flight controls, and inspection practices. This course will prepare students for completion of the FAA airframe mechanic certificate. This course will include lab elements that allow students to build necessary skills associated with the above understandings of FAA Maintenance General Section subjects.*	
Prerequisite(s)/ Corequisite(s)	Principles of Aviation Maintenance; Aviation Maintenance Fundamentals; Advanced Aviation Maintenance	
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a directed elective or elective for all diplomas Counts as a quantitative reasoning course	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	Schools partnering with Vincennes University must offer the program of study as part of a 2-3 period block in order to meet the contact hour requirements for VU aviation maintenance courses	
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Standard Trade & Industrial: Aircraft Operations K-12	
Rules 46-47	● Standard Trade & Industrial: Aircraft Operations 9-12 ● Occupational Specialist I, II or III: Aircraft Operations 9-12	
Rules 2002	● CTE: Trade & Industrial: Aviation Operations ● Workplace Specialist: Aviation Operations	
REPA/REPA 3	● CTE: Trade & Industrial: Aviation Operations 5-12 ● Workplace Specialist: Aviation 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment		
VU Course Alignment	AMNT 210/L (Lab): Airframe Systems*; AMNT 212/L (Lab): Airframe Electrical, Instruments, and Communications*; AMNT 214/L (Lab): Metallic Structures*; AMNT 216/L (Lab): Non-Metallic Structues*; AMNT 218/L (Lab): Hydraulics, Landing Gear, Flight Controls, and Inspection*	
Four Yr. Course		

Alignment	
Postsecondary Credential	Aviation Maintenance Technology – Airframe Certificate C.G. (47.0607)
Liberal Arts/Sciences Requirements	
Promoted Certifications	Airframe and Powerplant Technician (FAA Part 147)

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Environmental Systems***
	Demonstrates understanding of:
7378.D1.1	Pressurization systems.
7378.D1.2	Bleed air heating.
7378.D1.3	Aircraft instrument cooling
7378.D1.4	Exhaust heat exchanger and system component(s) function, operation, and inspection procedures.
7378.D1.5	Combustion heater and system component(s) function, operation, and inspection procedures.
7378.D1.6	Vapor-cycle system and system component(s) operation, servicing, and inspection procedures.
7378.D1.7	Air-cycle system and system component(s) operation and inspection procedures.
7378.D1.8	Cabin pressurization and system component(s) operation and inspection procedures.
7378.D1.9	Types of oxygen systems and oxygen system component(s) operation (e.g., chemical generator, pressure cylinder).
7378.D1.10	Oxygen system maintenance and inspection procedures.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D1.11	Oxygen system maintenance.
7378.D1.12	Recovery of vapor-cycle refrigerant.
7378.D1.13	Handling or performing maintenance on chemical oxygen generating systems.
7378.D1.14	Storage, handling, and use of compressed gas cylinder and high-pressure systems.
7378.D1.15	Manufacturer's recommended servicing procedures, including refrigerant types.
7378.D1.16	Maintenance of combustion heaters.
	Skills:
7378.D1.17	Inspect an oxygen system.
7378.D1.18	Purge an oxygen system prior to servicing.
7378.D1.19	Service an oxygen system.
7378.D1.20	Clean and inspect a pilot emergency oxygen mask and supply hoses.
7378.D1.21	Inspect an oxygen system pressure regulator.
7378.D1.22	Inspect an oxygen system cylinder for serviceability.
7378.D1.23	Inspect a chemical oxygen generator for serviceability and safe handling.
7378.D1.24	Locate the procedures to troubleshoot a combustion heater.
7378.D1.25	Locate the procedures for servicing a refrigerant (vapor-cycle) system.
7378.D1.26	Inspect a combustion heater fuel system for leaks.
7378.D1.27	Locate the troubleshooting procedures for an air-cycle system.
7378.D1.28	Troubleshoot an air-cycle air conditioning system.

7378.D1.29	Inspect a cabin heater system equipped with an exhaust heat exchanger for cracks.
7378.D1.30	Clean and inspect an outflow valve for a pressurization system.
7378.D1.31	Locate troubleshooting procedures for a pressurization system.
Domain	***Aircraft Fuel Systems***
	Demonstrates understanding of:
7378.D2.1	Fuel system types.
7378.D2.2	Fuel system components, including filters and selector valves.
7378.D2.3	Aircraft fuel tanks/cells
7378.D2.4	Fuel flow.
7378.D2.5	Fuel transfer, fueling, and defueling.
7378.D2.6	Fuel jettisoning/dump systems.
7378.D2.7	Characteristics of fuel types.
7378.D2.8	Fuel system maintenance and inspection.
7378.D2.9	Fuel quantity indication.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D2.10	Fuel system maintenance.
7378.D2.11	Fuel system contamination.
7378.D2.12	Fuel spills.
7378.D2.13	Fuel system maintenance requiring fuel tank entry.
7378.D2.14	Defueling aircraft.
	Skills:
7378.D2.15	Inspect, check, troubleshoot, or repair a fuel system.
7378.D2.16	Inspect a metal, bladder, or integral fuel tank.
7378.D2.17	Troubleshoot and repair aircraft fuel system.
7378.D2.18	Inspect a fuel selector valve.
7378.D2.19	Inspect and check manually operated fuel valves for proper operation and leaks.
7378.D2.20	Troubleshoot a fuel valve problem.
7378.D2.21	Drain fuel system sump(s).
7378.D2.22	Service a fuel system strainer.
7378.D2.23	Inspect a fuel quantity indicating system.
7378.D2.24	Locate fuel system operating instructions.
7378.D2.25	Locate fuel system inspection procedures.
7378.D2.26	Locate fuel system cross feed procedures.
7378.D2.27	Locate fuel system required placards.
7378.D2.28	Locate fuel system defueling procedures.
7378.D2.29	Troubleshoot fuel pressure warning system.
7378.D2.30	Locate troubleshooting procedures for fuel temperature systems.
7378.D2.31	Remove and install a fuel quantity transmitter.
7378.D2.32	Troubleshoot fuel quantity indicating system.
Domain	***Water and Waste Systems***
	Demonstrates understanding of:
7378.D3.1	Potable water system components and operation.
7378.D3.2	Lavatory waste system components and operation.
7378.D3.3	Inspection and servicing requirements for water and waste systems.
	Demonstrates ability to identify, assess, and mitigate risks associated with:

7378.D3.4	Servicing lavatory waste systems, including use of safety equipment.
	Skills:
7378.D3.5	Locate and explain the procedures for servicing a lavatory waste system.
7378.D3.6	Locate and explain the procedures for servicing a potable water system.
Domain	***Ice and Rain Control Systems***
	Demonstrates understanding of:
7378.D4.1	Aircraft icing causes/effects.
7378.D4.2	Ice detection systems.
7378.D4.3	Aircraft and powerplant anti-ice systems and components.
7378.D4.4	De-ice systems and components.
7378.D4.5	Wiper blade, chemical, and pneumatic bleed air rain control systems.
7378.D4.6	Anti-icing and de-icing system maintenance.
7378.D4.7	Environmental conditions that degrade vision.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D4.8	System testing or maintenance.
7378.D4.9	Storage and handling of deicing fluids.
7378.D4.10	Selection and use of cleaning materials for heated windshields.
	Skills:
7378.D4.11	Inspect and operationally check pitot-static anti-ice system.
7378.D4.12	Inspect and operationally check deicer boot.
7378.D4.13	Clean a pneumatic deicer boot.
7378.D4.14	Troubleshoot an electrically heated pitot system.
7378.D4.15	Inspect thermal anti-ice systems.
7378.D4.16	Inspect and operationally check an electrically heated windshield.
7378.D4.17	Locate and explain the procedures for inspecting an electrically operated windshield wiper system.
7378.D4.18	Locate and explain the procedures for replacing blades on a windshield wiper system.
7378.D4.19	Locate and explain the procedures for inspecting a pneumatic rain removal system.
Domain	***Airframe Fire Protection Systems***
	Demonstrates understanding of:
7378.D5.1	Types of fires and aircraft fire zones.
7378.D5.2	Overheat and fire detection and warning systems.
7378.D5.3	Overheat and fire detection system maintenance and inspection.
7378.D5.4	Smoke and carbon monoxide detection systems.
7378.D5.5	Fire extinguishing agents.
7378.D5.6	Types of fire extinguishing systems.
7378.D5.7	Fire extinguishing system maintenance and inspection requirements.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D5.8	Maintenance on circuits associated with fire bottle squibs.
7378.D5.9	Use of PPEs when working on or testing fire extinguishing systems.
7378.D5.10	Fire extinguishing agents.
	Skills:
7378.D5.11	Troubleshoot an aircraft fire detection or extinguishing system.
7378.D5.12	Determine proper container pressure for an installed fire extinguisher system.
7378.D5.13	Identify maintenance procedures for fire detection and extinguishing system(s) and system

	component(s).
7378.D5.14	Inspect a smoke and toxic gas detection system.
7378.D5.15	Inspect a carbon monoxide detector.
7378.D5.16	Locate and explain the procedures for checking a smoke detection system.
7378.D5.17	Locate and explain the procedures for inspecting an overheat detection system.
7378.D5.18	Inspect fire protection system cylinders and check for hydrostatic test date.
7378.D5.19	Inspect fire detection/protection system.
7378.D5.20	Perform operational check of fire detection/protection system.
7378.D5.21	Inspect fire extinguishing agent bottle discharge cartridge.
7378.D5.22	Inspect a continuous-loop type fire detection system.
Domain	***Rotorcraft Fundamentals***
	Demonstrates understanding of:
7378.D6.1	Rotorcraft aerodynamics.
7378.D6.2	Flight controls.
7378.D6.3	Transmissions.
7378.D6.4	Rigging requirements for rotary wing aircraft.
7378.D6.5	Design, type, and operation of rotor systems.
7378.D6.6	Helicopter skid shoe and tube inspection.
7378.D6.7	Rotor blade functions and construction.
7378.D6.8	Rotor vibrations, track, and balance.
7378.D6.9	Drive system vibrations and inspection.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D6.10	Working around helicopter blades during ground operations.
7378.D6.11	Ground-handling procedures.
7378.D6.12	Ground operations and functional tests.
7378.D6.13	Maintenance and inspection of rotorcraft systems and components.
	Skills:
7378.D6.14	Locate components of a helicopter rotor system.
7378.D6.15	Locate helicopter rotor blade track and balance procedures.
7378.D6.16	Locate and explain procedures needed to rig helicopter controls.
7378.D6.17	Locate and explain procedures to track and balance a rotor system.
Domain	***Aircraft Electrical Systems***
	Demonstrates understanding of:
7378.D7.1	Generators, DC generation systems, and DC power distribution systems.
7378.D7.2	Alternators, AC generation systems, and AC power distribution systems.
7378.D7.3	Starter generators.
7378.D7.4	Constant speed drive (CSD) and integrated drive generator (IDG) systems and components.
7378.D7.5	Voltage regulators and over-volt and overcurrent protection.
7378.D7.6	Inverter systems.
7378.D7.7	Aircraft wiring sizes, types, selection, installation, and circuit protection devices.
7378.D7.8	Derating factors in switch selection.
7378.D7.9	Aircraft wiring shielding.
7378.D7.10	Aircraft lightning protection.
7378.D7.11	Instrument or instrument panel removal and installation.
7378.D7.12	Aircraft lighting systems.

7378.D7.13	Electrical system troubleshooting.
7378.D7.14	Soldering preparation, types of solder, and flux usage.
7378.D7.15	Aircraft electrical connectors, splices, terminals, and switches.
7378.D7.16	Electrical system measurement, adjustment, and testing.
7378.D7.17	Aircraft battery troubleshooting and maintenance.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D7.18	Testing/troubleshooting electrical systems or components.
7378.D7.19	Connecting or disconnecting external power.
7378.D7.20	Maintenance on energized circuits/systems.
7378.D7.21	Maintenance in areas containing aircraft wiring.
7378.D7.22	Routing and securing wires and wire bundles.
7378.D7.23	Selecting the size of wire in an electrical circuit.
7378.D7.24	Selection or installation of wire terminals.
7378.D7.25	Effects of soldering.
7378.D7.26	Soldering practices.
	Skills:
7378.D7.27	Inspect aircraft wiring to verify installation and routing.
7378.D7.28	Perform wire terminating and splicing.
7378.D7.29	Assemble an aircraft electrical connector.
7378.D7.30	Use a wiring circuit diagram to identify components.
7378.D7.31	Solder aircraft wiring.
7378.D7.32	Troubleshoot an airframe electrical circuit.
7378.D7.33	Install airframe electrical wiring, switches, or protective devices.
7378.D7.34	Secure wire bundles.
7378.D7.35	Determine an electrical load in a given aircraft system.
7378.D7.36	Install bonding jumpers.
7378.D7.37	Check output voltage of a DC generator.
7378.D7.38	Check the resistance of an electrical system component.
7378.D7.39	Inspect generator brush serviceability and brush spring tension.
7378.D7.40	Inspect and check anti-collision, position, and landing lights for proper operation.
7378.D7.41	Inspect components in an electrical system.
7378.D7.42	Troubleshoot a DC electrical system supplied by an AC electrical system.
7378.D7.43	Identify components in an electrical schematic where AC is rectified to a DC voltage.
7378.D7.44	Perform a continuity test to verify the condition of a conductor.
7378.D7.45	Perform a test on a conductor for a short to ground.
7378.D7.46	Perform a test on a conductor for a short to other conductors.
Domain	***Aircraft Instrument Systems***
	Demonstrates understanding of:
7378.D8.1	Annunciator indicating systems and the meaning of warning, caution, and advisory lights.
7378.D8.2	Magnetic compass inspection and operation.
7378.D8.3	Magnetic compass swinging procedures.
7378.D8.4	Pressure indicating instruments.
7378.D8.5	Temperature indicating instruments.
7378.D8.6	Position indication sensors and instruments.
7378.D8.7	Gyroscopic instruments.

7378.D8.8	Direction indicating instruments.
7378.D8.9	Instrument vacuum and pneumatic systems.
7378.D8.10	Pitot-static system.
7378.D8.11	Fuel quantity indicating systems.
7378.D8.12	Instrument range markings.
7378.D8.13	Electronic displays.
7378.D8.14	Electrostatic sensitive devices.
7378.D8.15	Built-in test equipment.
7378.D8.16	Electronic flight instrument system.
7378.D8.17	Engine indication and crew alerting system.
7378.D8.18	Head-up displays (HUDs).
7378.D8.19	14 CFR parts 43 and 91 requirements for static system leak checks.
7378.D8.20	Instrument limitations, conditions, and characteristics.
7378.D8.21	Angle of attack and stall warning systems.
7378.D8.22	Takeoff and landing gear configuration warning systems.
7378.D8.23	Bonding and protection.
7378.D8.24	Instrument or instrument panel removal and installation.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D8.25	Use of pressurized air and water during maintenance or cleaning of aircraft instrument systems.
7378.D8.26	Actions in response to a reported intermittent warning or caution annunciator light illumination.
7378.D8.27	Performing maintenance on equipment identified as electrostatic-sensitive
7378.D8.28	Handling of mechanical gyros or instruments containing mechanical gyros.
7378.D8.29	Performing a pitot/static system test.
	Skills:
7378.D8.30	Perform a static system leak test.
7378.D8.31	Remove and install an instrument.
7378.D8.32	Install range marks on an instrument glass.
7378.D8.33	Determine barometric pressure using an altimeter.
7378.D8.34	Check for proper range markings on an instrument.
7378.D8.35	Inspect a magnetic compass.
7378.D8.36	Locate the procedures for troubleshooting a vacuum-operated instrument system.
7378.D8.37	Select proper altimeter for installation on a given aircraft.
7378.D8.38	Identify exhaust gas temperature system components.
7378.D8.39	Inspect a vacuum system filter for serviceability.
7378.D8.40	Adjust gyro/instrument air pressure/vacuum.
7378.D8.41	Inspect an aircraft's alternate air (static) source.
7378.D8.42	Locate and explain the adjustment procedures for a stall warning system.
7378.D8.43	Inspect outside air temperature gauge for condition and operation.
Domain	***Communications, Light Signals, and Runway Lighting Systems***
	Demonstrates understanding of:
7378.D9.1	Radio operating principles.
7378.D9.2	Radio components.
7378.D9.3	Antenna, static discharge wicks, and avionics identification, inspection, and mounting

	requirements.
7378.D9.4	Interphone and intercom systems.
7378.D9.5	Very high frequency (VHF), high frequency (HF), and SATCOM systems.
7378.D9.6	Aircraft Communication Addressing and Reporting System (ACARS) theory, components, and operation.
7378.D9.7	Emergency locator transmitter (ELT).
7378.D9.8	Automatic direction finder (ADF).
7378.D9.9	VHF omnidirectional range (VOR) theory, components, and operation.
7378.D9.10	Distance measuring equipment (DME) theory, components, and operation.
7378.D9.11	Instrument landing system (ILS) theory, components, and operation.
7378.D9.12	Global positioning system (GPS) theory, components, and operation.
7378.D9.13	Traffic collision avoidance system (TCAS), theory, components, and operation.
7378.D9.14	Weather radar.
7378.D9.15	Ground proximity warning system (GPWS) theory, components, and operation.
7378.D9.16	Autopilot theory, components, and operation.
7378.D9.17	Auto-throttle theory, components, and operation.
7378.D9.18	Stability augmentation systems (SAS) (Rotorcraft).
7378.D9.19	Radio altimeter (RA) theory, components, and operation.
7378.D9.20	Automatic Dependent Surveillance-Broadcast (ADS-B) theory, components, and operation.
7378.D9.21	Transponder/encoder system.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D9.22	ELT testing procedures.
7378.D9.23	Performing maintenance on high power/high frequency systems (e.g., weather radar and SATCOM).
7378.D9.24	Wire harness routing.
7378.D9.25	Mounting antennas.
7378.D9.26	Electro-static discharge.
7378.D9.27	Working around live electrical systems.
	Skills:
7378.D9.28	Make a list of required placards for communication and navigation avionic equipment.
7378.D9.29	Locate and explain autopilot inspection procedures.
7378.D9.30	List autopilot major components.
7378.D9.31	Locate and identify navigation and communication antennas.
7378.D9.32	Check VHF communications for operation.
7378.D9.33	Inspect a coaxial cable installation for security.
7378.D9.34	Check an emergency locator transmitter for operation.
7378.D9.35	Inspect ELT batteries for expiration date and locate proper testing procedures.
7378.D9.36	Inspect electronic equipment mounting base for security and condition.
7378.D9.37	Inspect electronic equipment shock mount bonding jumpers for resistance.
7378.D9.38	Inspect static discharge wicks for security and resistance.
7378.D9.39	Inspect a radio installation for security.
7378.D9.40	Locate and explain the installation procedures for antennas, including mounting and coaxial connections.
Domain	***Metallic Structures***
	Demonstrates understanding of:

7378.D10.1	Inspection/testing of metal structures.
7378.D10.2	Types of sheet metal defects.
7378.D10.3	Selection of sheet metal repair materials.
7378.D10.4	Layout, forming, and drilling of sheet metal components.
7378.D10.5	Selection of rivets, hardware, and fasteners for a sheet metal repair.
7378.D10.6	Heat treatment processes for aluminum.
7378.D10.7	Rivet layout.
7378.D10.8	Rivet removal and installation methods.
7378.D10.9	Maintenance safety practices/precautions for sheet metal repairs or fabrications.
7378.D10.10	Flame welding gases.
7378.D10.11	Storage/handling of welding gases.
7378.D10.12	Flame welding practices and techniques.
7378.D10.13	Inert-gas welding practices and techniques.
7378.D10.14	Purpose and types of shielding gases.
7378.D10.15	Types of steel tubing welding repairs.
7378.D10.16	Procedures for weld repairs.
7378.D10.17	Types of structures and their characteristics.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D10.18	Selection of repair materials.
7378.D10.19	Utilizing maintenance safety practices/precautions for sheet metal structures.
7378.D10.20	Use of PPE when working with sheet metal structures.
7378.D10.21	Handling, storage, and use of compressed gas bottles.
7378.D10.22	Use of electric welding equipment.
	Skills:
7378.D10.23	Install and remove solid rivets.
7378.D10.24	Install and remove a blind rivet.
7378.D10.25	Determine applicability of sheet metal for a repair in a specific application.
7378.D10.26	Select and install special purpose fasteners.
7378.D10.27	Design a repair using a manufacturer's structural repair manual.
7378.D10.28	Prepare and install a patch to repair an aircraft or component.
7378.D10.29	Make a drawing of a repair, including the number of rivets and size of sheet metal required.
7378.D10.30	Remove a repair that was installed with rivets.
7378.D10.31	Trim and form a piece of sheet metal to fit a prepared area.
7378.D10.32	Fabricate an aluminum part in accordance with a drawing.
7378.D10.33	Determine a rivet pattern for a specific repair.
7378.D10.34	Countersink rivet holes in sheet metal.
7378.D10.35	Perform a repair on a damaged aluminum sheet.
7378.D10.36	Determine extent of damage and decide if metallic structure is repairable.
Domain	***Non-metallic Structures***
	Demonstrates understanding of:
7378.D11.1	Wood structures, including inspection techniques, tools, and practices for wood structures.
7378.D11.2	Effects of moisture/humidity on wood and fabric coverings.
7378.D11.3	Types and general characteristics of wood used in aircraft structures.
7378.D11.4	Permissible substitutes and other materials used in the construction and repair of wood structures.

7378.D11.5	Acceptable and unacceptable wood defects.
7378.D11.6	Wood repair techniques and practices.
7378.D11.7	Factors used in determining the proper type covering material.
7378.D11.8	Types of approved aircraft covering material.
7378.D11.9	Seams commonly used with aircraft covering.
7378.D11.10	Covering textile terms.
7378.D11.11	Structure surface preparation.
7378.D11.12	Covering methods commonly used.
7378.D11.13	Covering means of attachment.
7378.D11.14	Areas on aircraft covering most susceptible to deterioration.
7378.D11.15	Aircraft covering preservation/restoration.
7378.D11.16	Inspection of aircraft covering.
7378.D11.17	Covering repair techniques and practices.
7378.D11.18	Inspection/testing of composite structures.
7378.D11.19	Types of composite structure defects.
7378.D11.20	Composite structure fiber, core, and matrix materials.
7378.D11.21	Composite materials storage practices and shelf life.
7378.D11.22	Composite repair methods, techniques, fasteners, and practices.
7378.D11.23	Thermoplastic material inspection/types of defects.
7378.D11.24	Thermoplastic material storage and handling.
7378.D11.25	Thermoplastic material installation procedures.
7378.D11.26	Care and maintenance of windows.
7378.D11.27	Window temporary and permanent repairs.
7378.D11.28	Maintenance safety practices/precautions for composite materials/structures, and windows.
7378.D11.29	Inspecting restraints and upholstery.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D11.30	Selection of glue (adhesive) or fasteners for aircraft structure.
7378.D11.31	Composite structure repairs.
7378.D11.32	Exposure to materials used in composite repair.
7378.D11.33	Storage of composite materials.
7378.D11.34	Measuring and mixing of materials associated with composite construction.
7378.D11.35	Use of materials that are not part of an approved repair system.
7378.D11.36	Material shelf-life.
	Skills:
7378.D11.37	Identify appropriate fasteners on composite structures.
7378.D11.38	Inspect and repair fiberglass.
7378.D11.39	Inspect composite, plastic, or glass-laminated structures.
7378.D11.40	Clean and inspect acrylic type windshields.
7378.D11.41	Locate and explain procedures for a temporary repair to a side window.
7378.D11.42	Locate and explain the procedures for tying a modified seine knot.
7378.D11.43	Prepare composite surface for painting.
7378.D11.44	Perform a tap test on composite material.
7378.D11.45	Locate and explain repair standard dimensions.
7378.D11.46	Locate and explain repair procedures for elongated bolt holes.
7378.D11.47	Determine extent of damage and decide if nonmetallic structure is repairable.

7378.D11.48	Perform lay up for a repair to a composite panel, including preparation for vacuum bagging, using a manufacturer's repair manual.
Domain	***Hydraulics and Pneumatics Systems***
	Demonstrates understanding of:
7378.D12.1	Hydraulic system components and fluids.
7378.D12.2	Hydraulic system operation.
7378.D12.3	Hydraulic system servicing requirements.
7378.D12.4	Hydraulic system inspection, check, servicing, and troubleshooting.
7378.D12.5	Pneumatic system types and components.
7378.D12.6	Pneumatic system servicing requirements.
7378.D12.7	Servicing, function, and operation of accumulators.
7378.D12.8	Types of hydraulic/pneumatic seals and fluid/seal compatibility.
7378.D12.9	Hoses, lines, and fittings.
7378.D12.10	Pressure regulators, restrictors, and valves.
7378.D12.11	Filter maintenance procedures.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D12.12	Relieving system pressure prior to system servicing or disassembly.
7378.D12.13	High pressure gases and fluids.
7378.D12.14	Storage and handling of hydraulic fluids.
7378.D12.15	Cross-contamination of hydraulic fluids.
7378.D12.16	Compatibility between hydraulic seals and hydraulic fluids.
	Skills:
7378.D12.17	Identify different types of hydraulic fluids.
7378.D12.18	Identify different packing seals.
7378.D12.19	Install seals and backup rings in a hydraulic component.
7378.D12.20	Remove and install a selector valve.
7378.D12.21	Check a pressure regulator and adjust as necessary.
7378.D12.22	Remove, clean, inspect, and install a hydraulic system filter.
7378.D12.23	Service a hydraulic system accumulator.
7378.D12.24	Service a hydraulic system reservoir.
7378.D12.25	Remove, install, and perform an operational check of a hydraulic pump.
7378.D12.26	Locate procedures for checking pneumatic/bleed air overheat warning systems.
7378.D12.27	Purge air from a hydraulic system.
7378.D12.28	Remove and install a system pressure relief valve.
7378.D12.29	Inspect a hydraulic or pneumatic system for leaks.
7378.D12.30	Troubleshoot a hydraulic or pneumatic system for leaks.
7378.D12.31	Locate and explain hydraulic fluid servicing instructions and identify/select fluid for a given aircraft.
7378.D12.32	Locate installation procedures for a seal, backup ring, or gasket.
Domain	***Landing Gear Systems***
	Demonstrates understanding of:
7378.D13.1	Fixed and retractable landing gear systems.
7378.D13.2	Fixed and retractable landing gear components.
7378.D13.3	Landing gear strut servicing/lubrication.
7378.D13.4	Inspection of bungee and spring steel landing gear systems.

7378.D13.5	Steering systems.
7378.D13.6	Landing gear position and warning system inspection, check, and servicing.
7378.D13.7	Brake assembly servicing and inspection.
7378.D13.8	Anti-skid system components and operation.
7378.D13.9	Wheel, brake, and tire construction.
7378.D13.10	Tire storage, care, and servicing.
7378.D13.11	Landing gear and tire and wheel safety and inspection.
7378.D13.12	Brake actuating systems.
7378.D13.13	Alternative landing gear systems (e.g., skis, floats).
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D13.14	Landing gear and tire and wheel practices/precautions.
7378.D13.15	Use of aircraft jacks.
7378.D13.16	High pressure fluids and gases.
7378.D13.17	Storage and handling of hydraulic fluids.
7378.D13.18	High pressure strut or system disassembly.
7378.D13.19	Operation of retractable landing gear systems around personnel.
	Skills:
7378.D13.20	Inspect and service landing gear.
7378.D13.21	Inspect, check, and service an anti-skid system.
7378.D13.22	Locate and explain procedures for checking operation of an anti-skid warning system.
7378.D13.23	Locate and explain troubleshooting procedures for an anti-skid system.
7378.D13.24	Jack aircraft.
7378.D13.25	Troubleshoot a landing gear retraction check.
7378.D13.26	Inspect wheels, brakes, bearings, and tires.
7378.D13.27	Remove and replace brake lining(s).
7378.D13.28	Service landing gear air/oil shock strut.
7378.D13.29	Bleed air from a hydraulic brake system.
7378.D13.30	Troubleshoot hydraulic brake systems.
7378.D13.31	Remove, inspect, and install a wheel brake assembly.
7378.D13.32	Inspect a tire for defects.
7378.D13.33	Locate tire storage practices.
7378.D13.34	Replace air/oil shock strut air valve.
7378.D13.35	Troubleshoot an air/oil shock strut.
7378.D13.36	Service a nose-wheel shimmy damper.
7378.D13.37	Inspect nose-wheel steering system for proper adjustment.
7378.D13.38	Locate and explain the process for checking landing gear alignment.
7378.D13.39	Replace master brake cylinder packing seals.
7378.D13.40	Troubleshoot aircraft steering system.
7378.D13.41	Identify landing gear position and warning system components.
7378.D13.42	Troubleshoot landing gear position and warning systems.
7378.D13.43	Inspect and repair landing gear position indicating system.
7378.D13.44	Adjust the operation of a landing gear warning system.
7378.D13.45	Remove, install, and adjust a landing gear down-lock switch.
7378.D13.46	Inspect a brake for serviceability.
7378.D13.47	Troubleshoot nose-wheel shimmy.

7378.D13.48	Inspect tube landing gear for damage.
Domain	***Airframe Inspection***
	Demonstrates understanding of:
7378.D14.1	Inspection requirements under 14 CFR part 91.
7378.D14.2	Maintenance recordkeeping requirements under 14 CFR part 43.
7378.D14.3	Requirements for complying with ADs.
7378.D14.4	Identification of life-limited parts and their replacement interval.
7378.D14.5	Special inspections.
7378.D14.6	Use of FAA-approved data.
7378.D14.7	Compliance with service letters, service bulletins, instructions for continued airworthiness, or ADs.
7378.D14.8	CFRs applicable to inspection and airworthiness.
7378.D14.9	Corrosion types and identification.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D14.10	Interpretation of inspection instructions, which can lead to over or under maintenance being performed.
7378.D14.11	Visual inspection and where to apply it.
7378.D14.12	Performing radiographic inspections.
7378.D14.13	Selection and use of checklists and other maintenance publications.
7378.D14.14	Maintenance record documentation.
	Skills:
7378.D14.15	Perform an airframe inspection, including a records check.
7378.D14.16	Perform a portion of a 100-hour inspection in accordance with 14 CFR part 43.
7378.D14.17	Enter results of a 100-hour inspection in a maintenance record.
7378.D14.18	Determine compliance with a specific AD.
7378.D14.19	Provide a checklist for conducting a 100-hour inspection.
7378.D14.20	Determine if any additional inspections are required during a particular 100-hour inspection; (i.e., 300-hour filter replacement).
7378.D14.21	Inspect seat and seatbelt, including TSO markings.
Domain	***Flight Controls***
	Demonstrates understanding of:
7378.D15.1	Control cables, Control cable maintenance, Cable connectors, Cable guides, Control stops.
7378.D15.2	Push-pull tubes, Torque tubes, Bellcranks.
7378.D15.3	Flutter and flight control balance.
7378.D15.4	Rigging of aircraft flight controls.
7378.D15.5	Aircraft flight controls and stabilizer systems.
7378.D15.6	Other aerodynamic wing features.
7378.D15.7	Secondary and auxiliary control surfaces.
	Demonstrates ability to identify, assess, and mitigate risks associated with:
7378.D15.8	Use of and interpretation of a cable tension chart.
7378.D15.9	Rigging aircraft flight controls.
7378.D15.10	Selection and use of lifting equipment used to move aircraft components into place for assembly.
7378.D15.11	Maintaining a calibration schedule for cable tension meters and other rigging equipment.
7378.D15.12	Use and interpretation of cable tensiometers.

	Skills:
7378.D15.13	Identify fixed-wing aircraft rigging adjustment locations.
7378.D15.14	Identify control surfaces that provide movement about an aircraft's axes.
7378.D15.15	Inspect a primary and secondary flight control surface.
7378.D15.16	Remove and reinstall a primary flight control surface.
7378.D15.17	Inspect primary control cables.
7378.D15.18	Adjust and secure a primary flight control cable.
7378.D15.19	Adjust push-pull flight control systems.
7378.D15.20	Check the balance of a flight control surface.
7378.D15.21	Determine allowable axial play limits for a flight control bearing.
7378.D15.22	Inspect a trim tab for free play, travel, and operation.
7378.D15.23	Balance a control surface.
7378.D15.24	Fabricate a primary flight control cable.
7378.D15.25	Locate aircraft flight control travel limits.

Supply Chain & Transportation Aviation Management							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7214	Principles of Aviation Management	7217	Private Pilot Theory	7207	Aviation Operations and Safety	7385	Aviation Management Capstone

Principles of Aviation Management		
Career Cluster	Supply Chain & Transportation	
Program of Study	Aviation Management	
NLPS Sequence	A	
Course Code	7214	
Course Description	*Principles of Aviation Management provides students the opportunity to develop an understanding of various aspects of the aviation industry to include general regulations and laws associated with the field. Included is an overview of the aviation field and all employment opportunities. Areas of study include aerodynamics, aircraft systems, performance, weight and balance, physiology, regulations, cross country planning, weather, and decision-making skills. Students will also learn of the departments associated with an airport and their impact on the industry as a whole.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Aircraft Operations K-12	
Rules 46-47	● Standard Trade & Industrial: Aircraft Operations 9-12 ● Occupational Specialist I, II or III: Aircraft Operations 9-12	
Rules 2002	● CTE: Trade & Industrial: Aviation Operations ● Workplace Specialist: Aviation Operations	
REPA/REPA 3	● CTE: Trade & Industrial Aviation Operations 5-12 ● Workplace Specialist: Aviation 9-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AVIT 111: Introduction to Aviation Technology
VU Course Alignment	AMNT 100: Introduction to Aviation*
Four Yr. Course Alignment	
Postsecondary Credential	CT Aviation Operations (49.0104), TC Aviation Management (49.0104)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Aviation***
7214.D1.1	Identify current events in the field of aviation and discuss their relationship and potential effects on the aviation industry.
7214.D1.2	Identify and assess career opportunities in the aviation industry (both civil and military) and identify the attributes of an aviation professional.
7214.D1.3	List and discuss all regulating agencies used in the industry
7214.D1.4	Identify specific Federal Aviation Regulations (FARs) and discuss their importance.
7214.D1.5	Use of Aviation within industry and business.
7214.D1.6	Describe all systems used within the airport proper and national airspace.
7214.D1.7	Identify all aircraft classifications.
7214.D1.8	Identify aviation safety issues.
7214.D1.9	Understand aviation human factors issues.
Domain	***Career Navigation***
7214.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7214.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7214.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7214.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7214.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7214.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7214.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional

	networking.
7214.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7214.D4.1	Demonstrate computer literacy skills and basic computer functions.
7214.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7214.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7214.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Private Pilot Theory		
Career Cluster	Supply Chain & Transportation	
Program of Study	Aviation Management	
NLPS Sequence	B	
Course Code	7217	
Course Description	*In Private Pilot Theory students will receive ground school knowledge required for certification as a private pilot with an airplane single engine land rating. Areas of study include aerodynamics, aircraft systems, performance, weight and balance, physiology, regulations, cross country planning, weather, and decision-making skills.*	
Prerequisite(s)/ Corequisite(s)	Principles of Aviation Management	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Aircraft Operations K-12	
Rules 46-47	● Standard Trade & Industrial: Aircraft Operations 9-12 ● Occupational Specialist I, II or III: Aircraft Operations 9-12	
Rules 2002	● CTE: Trade & Industrial: Aviation Operations ● Workplace Specialist: Aviation Operations	
REPA/REPA 3	● CTE: Trade & Industrial Aviation Operations 5-12 ● Workplace Specialist: Aviation 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		

ITCC Course Alignment	AVIT 120: Private Pilot Theory
VU Course Alignment	AFLT 100: Private Ground School*;AFLT 210: Aircraft Systems, Performance, and Aerodynamics*
Four Yr. Course Alignment	
Postsecondary Credential	CT Aviation Operations (49.0104), TC Aviation Management (49.0104)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Private Pilot Theory***
7217.D1.1	Develop an in-depth working knowledge of the fundamentals of aviation
7217.D1.2	Differentiate commercial, military, and general aviation principles
7217.D1.3	Interpret and implement aviation regulations
7217.D1.4	Develop a knowledge of aerodynamics theory
7217.D1.5	Create a working knowledge of aircraft systems
7217.D1.6	Develop decision making and problem-solving skills related to flight
7217.D1.7	Demonstrate the ability to pass the FAA Private Pilot knowledge exam
7217.D1.8	Understand aircraft systems and design elements commonly found on various aircraft.
7217.D1.9	Correlate knowledge of aerodynamic principles and aircraft design characteristics to evaluate aircraft performance and stability by visually inspecting various aircraft.
7217.D1.10	Apply knowledge of commonly used aircraft performance charts and tables to accurately predict performance.

Aviation Safety and Operations	
Career Cluster	Supply Chain & Transportation
Program of Study	Aviation Management
NLPS Sequence	C
Course Code	7207
Course Description	*Aviation Safety and Operations provides an overview of general aviation operations, including the operation and management of the Fixed Base Operation (FBO). It introduces the challenges and complexity of aviation security faced by aviation professionals across the industry and traces the evolution of current security approaches and explores technologies and processes targeting threat mitigation and improved operational efficiency. Emphasis will be placed on financial and operational considerations as well as on regulatory requirements*

	and constraints.
Prerequisite(s)/ Corequisite(s)	Principles of Aviation Management
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level I
Bulletin 400	● Standard Trade & Industrial: Aircraft Operations K-12	
Rules 46-47	● Standard Trade & Industrial: Aircraft Operations 9-12 ● Occupational Specialist I, II or III: Aircraft Operations 9-12	
Rules 2002	● CTE: Trade & Industrial: Aviation Operations ● Workplace Specialist: Aviation Operations	
REPA/REPA 3	● CTE: Trade & Industrial Aviation Operations 5-12 ● Workplace Specialist: Aviation 9-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AVIT 132: Aviation Operations; AVIT 138: Aviation Weather Services
VU Course Alignment	AFLT 285: Aviation Weather*
Four Yr. Course Alignment	
Postsecondary Credential	CT Aviation Operations (49.0104), TC Aviation Management (49.0104)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Aviation Operations***
7207.D1.1	Understand the role of the Fixed Base Operator in the National Airspace System.
7207.D1.2	Identify general aviation management functions.
7207.D1.3	Describe and outline corporate aviation including business use of aircraft, corporate flight departments, and the types of aircraft used by that industry.
7207.D1.4	Identify and describe the linkages among the manufacturers, fixed base operators, and corporate operators.
7207.D1.5	Compare and contrast the inter-working of the unique components of the general aviation

	industry.
7207.D1.6	Demonstrate an understanding of marketing techniques.
7207.D1.7	Demonstrate understanding of basic aviation fiscal administration.
7207.D1.8	Understand the role of human resources in the general aviation environment.
7207.D1.9	Identify general aviation organization and administrative functions.
7207.D1.10	Identify functions of the flight line and front desk.
7207.D1.11	Outline and explain the Federal Aviation Regulations that apply to general aviation flight training and maintenance.
7207.D1.12	Demonstrate an understanding of aviation management information systems.
7207.D1.13	Demonstrate an understanding of basic general aviation maintenance procedures.
7207.D1.14	Demonstrate an understanding of general aviation safety and liability.
7207.D1.15	Demonstrate an understanding of general aviation physical facilities.
Domain	***Aviation Weather***
7207.D2.1	Development basic knowledge of meteorology and its effect on the aviation environment.
7207.D2.2	Demonstrate how the aviation weather service program functions.
7207.D2.3	Learn about industry changes both current and in the future that will affect flight planning and flight safety.
7207.D2.4	Interpret and explain weather reports, forecasts, weather charts, and flight briefings.
7207.D2.5	Learn the limitations of weather observations and forecasts.
7207.D2.6	Create go/no-go decisions.
7207.D2.7	Build professional communications skills.
7207.D2.8	Interpret written, graphic, and other weather information sources as they apply to aviation.
7207.D2.9	Identify several weather hazards and discuss their causes.
7207.D2.10	Explain the basics of aviation weather, which includes: the atmosphere; weather systems; pressure, altitude, and density; stability and instability; wind; temperature and its effects; atmospheric moisture
7207.D2.11	Identify the FAA required alternate minimums for an IFR flight plan.

Aviation Management Capstone	
Career Cluster	Supply Chain & Transportation
Program of Study	Aviation Management
NLPS Sequence	D
Course Code	7385
Course Description	*Aviation Management Capstone is an introduction to the aviation weather service program. Course topics include the National Weather Service, Flight Service Stations, International Civil Aviation Organization, and analyzing and interpreting weather reports and maps. Additionally, this course will prepare students for certification as an Instrument Pilot with an Airplane Single Engine Land rating. Areas of study include basic instrument flying, flying instruments, IFR charts and approach plates, IFR regulations and procedures, ATC clearances, and IFR flight planning.*
Prerequisite(s)/	Principles of Aviation Management; Private Pilot Theory; Aviation Safety and Operations

Corequisite(s)		
Credits	2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max	
Counts Toward	Counts as a directed elective or elective for all diplomas Counts as a quantitative reasoning course	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	There are no standards or competencies included for private flight training. The decision to provide flight training as a part of this program of study is completely optional and is a local decision. A school or career center accepts all liability if they decide to include private flight training as a part of this program of study.	
ADDITIONAL COURSE INFO		
Funding	Moderate Value	Level II
Bulletin 400	● Standard Trade & Industrial: Aircraft Operations K-12	
Rules 46-47	● Standard Trade & Industrial: Aircraft Operations 9-12 ● Occupational Specialist I, II or III: Aircraft Operations 9-12	
Rules 2002	● CTE: Trade & Industrial: Aviation Operations ● Workplace Specialist: Aviation Operations	
REPA/REPA 3	● CTE: Trade & Industrial Aviation Operations 5-12 ● Workplace Specialist: Aviation 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	AVIT 135: Aviation Safety Management Systems, AVIT 202: Instrument Pilot Theory; AVIT 205: Instrument Pilot Flight Training*; AVIT 208: Air Traffic Control	
VU Course Alignment	AFLT 225/225L – Human Factors and Safety/Lab*; AFLT 291 – Aviation Law and Regulations*	
Four Yr. Course Alignment		
Postsecondary Credential	CT Aviation Operations (49.0104), TC Aviation Management (49.0104)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Aviation Safety Management***	
7385.D1.1	Develop an outline of the essential characteristics of natural and man-made threats to national and international aviation.	
7385.D1.2	Solve problems as an individual and in coordination with team members.	
7385.D1.3	Compose historical timelines reflecting methods and outcomes used to counter aviation security threats.	

7385.D1.4	Identify functions and interdependencies of local, national, and international aviation security agencies.
7385.D1.5	Differentiate between individual privacy and national security related to aviation.
7385.D1.6	Exhibit the knowledge, skills, and attitudes necessary to be a success in the chosen area of the aviation industry.
7385.D1.7	Develop an ability to do basic research, interpret and analyze the data and make useful presentations based on that research.
7385.D1.8	Develop the basic knowledge, skills, and attitudes needed to be useful participants in the student's profession, society, and country, i.e., higher order thinking, communicating, interacting, managing information, and valuing.
7385.D1.9	Identify the different portions of CRM
7385.D1.10	List the reasons that CRM are important on the flight deck
7385.D1.11	Distinguish between different CRM training applications
7385.D1.12	Implement positive CRM strategies to flight operations
7385.D1.13	Identify hazardous situations requiring CRM control elements
7385.D1.14	Analyze various situations and apply the best CRM strategy
7385.D1.15	Recognize human limitations as they apply to aviation operations
7385.D1.16	Develop strategies for handling human limitations as they apply to aviation operations
Domain	***Air Traffic Control***
7385.D2.1	Exhibit a high level of comprehension about the ATC system in the United States.
7385.D2.2	Determine how flights are coordinated between airlines, airports, and ATC services.
7385.D2.3	Discuss major regulations involving the National Airspace System.
7385.D2.4	Comprehend the Code of Federal Aviation Regulations.
7385.D2.5	Possess a working knowledge of the terminology specific to the industry.
7385.D2.6	Demonstrate a fundamental knowledge of navigational aids available to aviation professionals.
7385.D2.7	Demonstrate a working knowledge of ATC procedures to include control tower operations, non-radar operations, and radar operations.
7385.D2.8	Explain the different types of environmental concerns within a geographic area.
Domain	***Aviation Law***
7385.D3.1	Develop a basic understanding of administrative, tort, criminal, contract, labor, and international law as they relate to the aviation industry.
7385.D3.2	Exhibit the skills needed to read and understand reported court cases, statutes, and administrative regulations.
7385.D3.3	Apply general legal theories to aviation topics.
7385.D3.4	Identify various laws and regulating agencies relating to the aviation industry.
7385.D3.5	Describe the legal and regulatory environments which surround the field of aviation.
7385.D3.6	Discuss the legal issues affecting airline operations, civil aviation, Fixed Base Operators, and airport administrators.
7385.D3.7	Exhibit an ability to identify and mitigate aviation related actions that may be counter to aviation laws and regulations.
7385.D3.8	Understand the basics of the US legal system
7385.D3.9	Gain the ability to describe different aviation company choices
7385.D3.10	Understand the legal process of FAA enforcement actions
7385.D3.11	Describe aviation administrative bodies and their legal functions
7385.D3.12	Understand employment law as it pertains to aviation

Supply Chain & Transportation Commercial Driver's License (Concentrator Sequence)							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7386	Principles of Transportation and Logistics	7387	Commercial Drivers Operations	7388	Advanced Commercial Driver Operations		

Principles of Transportation and Logistics		
Career Cluster	Supply Chain & Transportation	
Program of Study	Commercial Driver	
NLPS Sequence	A	
Course Code	7386	
Course Description	*Principles of Transportation and Logistics examines the structure and importance of the commercial transportation industry in the logistics sector of business. Topics covered include an in-depth examination of the various modes of transportation including discussions of regulations, economics, characteristics, and development in major transportation modes. Also discussed are costing and pricing issues in transportation and relationship management between buyers and sellers of transportation. Additionally, this course introduces students to an overview of the CDL licensure and prepares them to get their CDL permit.* ***Students are required to get a Department of Transportation Physical and Drug Screen.***	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	Recommended as a one-year concentrator sequence offered through a half day program	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● No License Available	
Rules 2002	● CTE: Trade & Industrial: Tractor/Trailer Operation ● Workplace Specialist: Tractor/Trailer Operation	
REPA/REPA 3	● CTE: Trade & Industrial Tractor/Trailer Operation 5-12 ● Workplace Specialist: Tractor/Trailer Operation 9-12	

POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	LOGM 100: Commercial Drivers License Theory*; LOGM 127: Introduction to Logistics
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT CDL Plus (49.0205)
Liberal Arts/Sciences Requirements	
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Trucking, Supply Chain Strategy and Planning, Logistics***
7386.D1.1	Discuss general knowledge of the trucking industry.
7386.D1.2	Understand the economic importance of logistics in both individual applications and global implications.
7386.D1.3	Understand the role of logistics in modern manufacturing.
7386.D1.4	Understand the effect of distribution in customer service relationships.
7386.D1.5	Define supply chain management and understand issues involved in creating and maintaining supply chain strategies.
7386.D1.6	Discuss global implications of supply chain management and logistics systems with respect to current technology.
7386.D1.7	Explain the central components of a logistics system and their integration.
7386.D1.8	Analyze improvement opportunities for today's manufacturing logistics systems.
Domain	***Safety***
7386.D2.1	Recognize key safety principles in operating a commercial vehicle.
7386.D2.2	Distinguish between safe, defensive driving practices and those practices that increase risk to the driver and the general public.
7386.D2.3	Comply with DOT regulations by submitting to a DOT physical.
7386.D2.4	Comply with DOT regulations by taking the CDL permit exam.
7386.D2.5	Identify hazardous materials and the procedures for handling them.
Domain	***CDL Permit***
7386.D3.1	Prepare for the CDL permit exam.
7386.D3.2	Prepare for multiple endorsements available to commercial truck drivers such as articulated vehicles, air brakes, passenger, and hazardous materials.
Domain	***Truck Equipment***

7386.D4.1	Review the equipment on a commercial vehicle.
7386.D4.2	Review and summarize the pre-trip process.
7386.D4.3	Discuss the importance of the pre-trip inspection.
7386.D4.4	Explain each individual part of the pre-trip process.
Domain	***Information and Inventory Management***
7386.D5.1	Discuss the different types of information systems and their use in logistics systems.
7386.D5.2	Distinguish the basic concepts and characteristics of different forms of transportation and the influence of transportation on plant and warehouse locations.
7386.D5.3	Apply techniques and methods for effective inventory management from a lean manufacturing perspective.
7386.D5.4	Design a warehouse operation layout considering safety, material handling, automation, information systems and lean manufacturing concepts.
Domain	***Career Navigation***
7386.D2.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7386.D2.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7386.D2.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7386.D2.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7386.D3.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7386.D3.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7386.D3.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7386.D3.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7386.D4.1	Demonstrate computer literacy skills and basic computer functions.
7386.D4.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7386.D4.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7386.D4.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Commercial Driver Operations Fundamentals		
Career Cluster	Supply Chain & Transportation	
Program of Study	Commercial Driver	
NLPS Sequence	B	
Course Code	7387	
Course Description	*Commercial Drivers Operation Fundamentals introduces students to an orientation of the CDL industry, the Commercial Driver's License (CDL), driver qualifications, and the commercial vehicle. The vehicle control systems are reviewed and discussed. The vehicle systems including engine, suspension, electrical, and many others are reviewed in detail. The vehicle inspection is practiced and applied. Range and on the road training in a tractor trailer are major components of this course. Students will discuss driving in a variety of conditions including at night, emergency situations, skidding, and extreme weather. Students will practice many different driving maneuvers including backing, turning, shifting, coupling, and space and speed management to prepare for the CDL A exam.* ***This course must be taken concurrently with Advanced Commercial Drivers Operations.***	
Prerequisite(s)/ Corequisite(s)	Principles of Transportation and Logistics; Co-enrolled in Advanced Commercial Drivers Operations	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	Recommended as a one-year concentrator sequence. Must be enrolled in both Commercial Drivers Operations Fundamentals and Advanced Commercial Drivers Operations.	
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● No License Available	
Rules 2002	● CTE: Trade & Industrial: Tractor/Trailer Operation ● Workplace Specialist: Tractor/Trailer Operation	
REPA/REPA 3	● CTE: Trade & Industrial Tractor/Trailer Operation 5-12 ● Workplace Specialist: Tractor/Trailer Operation 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	LOGM 102: Commercial Drivers License Application*; LOGM 103: Commercial Drivers Vehicle Operations I*	
VU Course Alignment		
Four Yr. Course Alignment		

Postsecondary Credential	CT CDL Plus (49.0205)
Liberal Arts/Sciences Requirements	
Promoted Certifications	CDL A

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Safety and Qualifications***
7387.D1.1	Discuss and review regulations in trucking.
7387.D1.2	Review driver qualifications.
7387.D1.3	Recognize key safety principles in operating a commercial vehicle.
Domain	***Engine Controls***
7387.D2.1	Describe the engine controls as well as the primary and secondary vehicle controls.
7387.D2.2	Identify and describe the controls for starting the engine, shifting, accelerating, braking, and parking.
7387.D2.3	Explain the acceptable operating range for oil, coolant, and electrical systems.
Domain	***Vehicle Systems***
7387.D3.1	Identify and describe all vehicle instruments and their purpose.
7387.D3.2	Recognize basic vehicle construction and systems including suspensions, axles, engine, fuel, exhaust, air intake, electrical, drive train, brake, steering ad coupling systems.
7387.D3.3	Use systematic procedure to conduct accurate and efficient vehicle inspection.
Domain	***Vehicle Inspection***
7387.D4.1	Identify damaged, loose, or missing parts.
7387.D4.2	Recognize and report system defects.
7387.D4.3	Explain why an undiscovered malfunction or vehicle problem can be unsafe and costly.
7387.D4.4	Explain the importance of having malfunctions corrected quickly.
7387.D4.5	Review Federal Motor Carrier Safety Regulations (FMCSR) regarding vehicle inspections.
7387.D4.6	Apply procedures for performing post trip inspections.
Domain	***Vehicle Operation***
7387.D5.1	Safely practice the basic control maneuvers in a commercial vehicle.
7387.D5.2	Demonstrate how to put the vehicle in motion and how to stop the vehicle.
7387.D5.3	Demonstrate proper application of shifting patterns and procedures to efficiently perform gear shifting maneuvers.
7387.D5.4	Demonstrate the ability to back a tractor-trailer including the ability to parallel park.
7387.D5.5	Apply the step-by-step procedures used to couple and uncouple the most standard tractor-trailer combination units.

7387.D5.6	Demonstrate the skills needed to perform a safe and effective visual search while on the road.
7387.D5.7	Review the principles of basic communication as it pertains to the professional driver.
7387.D5.8	Discuss the importance of speed and space management when it comes to operating a tractor-trailer during the day or night as well as in extreme conditions.
7387.D5.9	Identify road conditions and other road users that are a potential safety threat.
7387.D5.10	Discuss the importance of methods for carrying out evasive steering, emergency stops, off road recoveries, and proper responses to brake failures and blowouts.
7387.D5.11	Review all components and regulations of railroad crossings.
7387.D5.12	Discuss conditions that cause skids, the major type of skids, and the procedures for recovering from skids.
7387.D5.13	Review the characteristics of special rigs.

Advanced Commercial Driver Operations		
Career Cluster	Supply Chain & Transportation	
Program of Study	Commercial Driver	
NLPS Sequence	C	
Course Code	7388	
Course Description	*In Advanced Commercial Drivers Operations, students will continue to practice until mastery of the pre-trip inspection, which is a critical component of passing the CDL A exam. Administrative and professional components of being a professional driver are discussed and explained including hours of service, accident reporting, personal health, communication, and Compliance, Safety, and Accountability (CAS).* ***This course must be taken concurrently with Commercial Drivers Operations Fundamentals.*** *Upon successful completion of Commercial Drivers Operation Fundamentals and Advanced Commercial Drivers Operations the student will be eligible to take the CDL A examination.*	
Prerequisite(s)/ Corequisite(s)	Principles of Transportation and Logistics; Co-enrolled in Commercial Drivers Operations Fundamentals	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● No License Available	
Rules 46-47	● No License Available	
Rules 2002	● CTE: Trade & Industrial: Tractor/Trailer Operation	

	● Workplace Specialist: Tractor/Trailer Operation
REPA/REPA 3	● CTE: Trade & Industrial Tractor/Trailer Operation 5-12 ● Workplace Specialist: Tractor/Trailer Operation 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	LOGM 104: Commercial Drivers Vehicle Operations II*; LOGM 180: Commercial Drivers Internship*
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	CT CDL Plus (49.0205)
Liberal Arts/Sciences Requirements	
Promoted Certifications	CDL A
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Compliance, Safety, and Accountability (CAS)***
7388.D1.1	Discuss the importance of preventive maintenance and servicing to prevent breakdown and accidents.
7388.D1.2	Discuss the importance of diagnosing and reporting vehicle malfunctions as well as the student's role in troubleshooting.
7388.D1.3	Review the importance of properly handling cargo including proper and legal securement.
7388.D1.4	Summarize the basics of freight documentation.
7388.D1.5	Describe hazardous material basics, and what responsibilities are associated with hazardous material transportation.
7388.D1.6	Explain hours of service regulations, including operating within the legal limits and accurately completing a driver's record of duty status.
7388.D1.7	Plan all aspects of the trip for having proper paperwork on hand to planning an efficient and legal route of travel.
7388.D1.8	Explain accident scene procedures as well as fire prevention.
7388.D1.9	Discuss the many security issues facing truck drivers today.
7388.D1.10	Review a variety of subjects that together make for an alert, healthy, and safe driver.
7388.D1.11	Discuss the driver's highly visible role in representing the trucking industry.
7388.D1.12	Explain Compliance, Safety, and Accountability (CAS) and how this compliance and enforcement program affects the professional driving career.
7388.D1.13	Apply the basic business concepts that are important to be successful in the transportation industry.

Domain	Commercial Driving Internship
7388.D2.1	Gain practical on-the-job experience in commercial truck driving.
7388.D2.2	Develop an applied knowledge of the commercial truck driving.
7388.D2.3	Analyze, synthesize, and evaluate problems and information.
7388.D2.4	Apply problem solving skills using critical thinking.
7388.D2.5	Demonstrate professionalism through time management, ethics, and standards of conduct.
7388.D2.6	Prepare a professional report documenting the co-op/internship experience.

Supply Chain & Transportation Diesel Services							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
7216	Principles of Diesel Services	7210	Diesel Steering and Brakes	7211	Diesel Transmissions	7221	Diesel Services Capstone
						5622	Tractor Trailer Operations

Principles of Diesel Services		
Career Cluster	Supply Chain & Transportation	
Program of Study	Diesel Services	
NLPS Sequence	A	
Course Code	7216	
Course Description	*Principles of Diesel Technology introduces the maintenance requirements and procedures of modern diesel engines and medium and heavy-duty trucks. Proper procedures and requirements for the Federal Highway Safety Inspection (DOT) will be discussed and practiced. In addition, this course gives students an overview of the electrical operating systems of the modern automobile. Students will be introduced to the safety and operation of equipment and tools used in electrical diagnosis and repair in the automotive electrical industry. Students will study the fundamentals of electricity and automotive electronics.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Diesel Mechanics K-12	
Rules 46-47	● Standard Trade & Industrial: Diesel Mechanics 9-12 ● Occupational Specialist I, II or III: Diesel Mechanics 9-12	
Rules 2002	● CTE: Trade & Industrial: Diesel Service Technology ● Workplace Specialist: Diesel Service Technology	
REPA/REPA 3	● CTE: Trade & Industrial Diesel Services 5-12	

	● Workplace Specialist: Diesel Service 9-12
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	AUTI 111: Electrical Systems I; TRCK 100: Diesel Preventative Maintenance
VU Course Alignment	DESL 110/L (Lab): Diesel Electrical
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Truck Chassis System (47.0613), TC Diesel Heavy Truck Technology (47.0613) VU - A.S. Diesel Technology (47.0605)
Liberal Arts/Sciences Requirements	
Promoted Certifications	ASE - Electrical/Electronic Systems
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Preventive Maintenance***
7216.D1.1	Identify Proper shop safety practices while in the labs
7216.D1.2	Identify tools, equipment, & fasteners used in truck repair.
7216.D1.3	Identify and explain how the truck repair industry is structured.
7216.D1.4	Identify and explain operation of the major systems of the trucks.
7216.D1.5	Identify and explain what EPA, CAFÉ, FMCSR, CDL, and NHTSA regulations are and how they affect the transportation industry.
7216.D1.6	Perform complete FMC annual inspection of tractors and trailers.
7216.D1.7	Examine maintenance requirements and procedures for heavy duty trucks.
7216.D1.8	Change oil and filters and lubricate the complete chassis.
7216.D1.9	Perform CDL pre-trip inspections.
7216.D1.10	Perform the CDL air brake leak down safety test and inspection.
7216.D1.11	Attain readiness to take Torque exams.
7216.D1.12	Attain readiness to take SP/2 Mechanical Safety exam.
7216.D1.13	Attain readiness to take SP/2 Pollution Prevention exam.
Domain	***Basic Electrical***
7216.D2.1	Demonstrate safe shop practices while working with electrical systems.
7216.D2.2	Describe the basic laws of electricity and circuit construction.
7216.D2.3	Identify Electrical symbols and components.
7216.D2.4	Calculate resistance, current, and voltage problems using Ohms Laws.
7216.D2.5	Perform voltage, current, and resistance measurements using the proper measurement devices.
7216.D2.6	Perform voltage drop testing on multiplex and non-multiplex circuits.
7216.D2.7	Perform basic battery testing and diagnosis.
7216.D2.8	Identify starting and charging system components and circuits.
7216.D2.9	Diagnose starting and charging system faults.

7216.D2.10	Attain readiness to take Snap On 504 Multi-meter exam.
7216.D2.11	Demonstrate safe shop practices while working with electrical systems.
7216.D2.12	Describe the basic laws of electricity and circuit construction.
7216.D2.13	Identify Electrical symbols and components.
7216.D2.14	Calculate resistance, current, and voltage problems using Ohms Laws.
7216.D2.15	Perform voltage, current, and resistance measurements using the proper measurement devices.
7216.D2.16	Perform voltage drop testing on multiplex and non-multiplex circuits.
7216.D2.17	Perform basic battery testing and diagnosis.
7216.D2.18	Identify starting and charging system components and circuits.
7216.D2.19	Diagnose starting and charging system faults.
7216.D2.20	Attain readiness to be certified to use an industry standard multimeter or fluke meter (e.g. Snap-On EEDM504B4).
Domain	***Career Navigation***
7216.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
7216.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
7216.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
7216.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
7216.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
7216.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
7216.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
7216.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
7216.D5.1	Demonstrate computer literacy skills and basic computer functions.
7216.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
7216.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
7216.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Diesel Steering and Brakes		
Career Cluster	Supply Chain & Transportation	
Program of Study	Diesel Services	
NLPS Sequence	B	
Course Code	7210	
Course Description	*Diesel Steering and Brakes studies steering and suspension systems commonly used on modern tractors and trailers. Topics will include steering and suspension components, power steering units, alignment theory and procedures, tire repair and service, and wheel balancing. Diagnosis, repair, and servicing of components including modern air suspension systems will be emphasized. Additionally, this course will cover theory, service, and repair of medium and heavy truck brake systems and their components. Emphasis is given to air brakes and their theory of operation, repair, and service of system components. Spring brakes and anti-lock systems will be studied on tractors and trailers.*	
Prerequisite(s)/ Corequisite(s)	Principles of Diesel Technology	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Diesel Mechanics K-12	
Rules 46-47	● Standard Trade & Industrial: Diesel Mechanics 9-12 ● Occupational Specialist I, II or III: Diesel Mechanics 9-12	
Rules 2002	● CTE: Trade & Industrial: Diesel Service Technology ● Workplace Specialist: Diesel Service Technology	
REPA/REPA 3	● CTE: Trade & Industrial Diesel Services 5-12 ● Workplace Specialist: Diesel Service 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	TRCK 101: Steering and Suspension Systems; TRCK 121: Brakes	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Truck Chassis System (47.0613), TC Diesel Heavy Truck Technology (47.0613)	
Liberal		

Arts/Sciences Requirements	
Promoted Certifications	ASE Brakes; ASE Suspension & Steering

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Steering and Suspensions***
7210.D1.1	Identify tools used for steering and suspension repair.
7210.D1.2	Disable supplemental restraint systems in accordance with manufacturers' procedures.
7210.D1.3	Diagnose power steering systems and determine need for replacement.
7210.D1.4	Diagnose steering and suspension components to determine need for replacement.
7210.D1.5	Remove and replace steering and suspension components.
7210.D1.6	Describe steering and alignment geometry.
7210.D1.7	Perform pre-alignment checks according to industry standards.
7210.D1.8	Diagnose rear suspension system and determine needed service or repair.
7210.D1.9	Check and adjust all alignment angles and measurements.
7210.D1.10	Inspect, rotate, mount, and balance tires.
7210.D1.11	Repair tire leaks.
7210.D1.12	Inspect, service, and replace front leaf spring bushings, pins, and shackles.
7210.D1.13	Inspect and service air springs.
7210.D1.14	Inspect, diagnose, and repair air ride systems.
7210.D1.15	Inspect and service kingpins.
Domain	***Brakes***
7210.D2.1	Demonstrate proper shop safety practices while using brake tools and equipment.
7210.D2.2	Use and identify tools and equipment used to repair brake systems.
7210.D2.3	Identify and explore operation, construction, and nomenclature of braking system components including hydraulic, air, and mechanical control devices.
7210.D2.4	Use safety procedures while servicing caged spring brake systems.
7210.D2.5	Diagnose and repair ABS and traction control systems on tractors and trailers.
7210.D2.6	Diagnose, service, and repair air brake systems.
7210.D2.7	Test and service air supply and storage circuits.
7210.D2.8	Perform air brake leak down test.
7210.D2.9	Inspect, test, and repair air brake lines and hoses.
7210.D2.10	Replace drive axle bearings, hubs, axle shafts, seals, and wheel studs.

Diesel Transmissions	
Career Cluster	Supply Chain & Transportation
Program of Study	Diesel Services
NLPS Sequence	C
Course Code	7211
Course	*Diesel Transmissions explores theory, diagnosis, and overhaul procedures related to manual*

Description	*transmissions and differentials. Course topics include service of twin countershaft, under-drive, overdrive, power-dividers, and air shift systems. Additionally, this course studies precision tools, equipment, and procedures needed to repair modern diesel engines. Repair, proper assembly, and component identification are examined along with service of removable cylinder liners.*	
Prerequisite(s)/ Corequisite(s)	Principles of Diesel Technology	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Standard Trade & Industrial: Diesel Mechanics K-12	
Rules 46-47	● Standard Trade & Industrial: Diesel Mechanics 9-12 ● Occupational Specialist I, II or III: Diesel Mechanics 9-12	
Rules 2002	● CTE: Trade & Industrial: Diesel Service Technology ● Workplace Specialist: Diesel Service Technology	
REPA/REPA 3	● CTE: Trade & Industrial Diesel Services 5-12 ● Workplace Specialist: Diesel Service 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	TRCK 125: HT Transmission/ Differential; TRCK 127: Engine Repair	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Truck Chassis System (47.0613), TC Diesel Heavy Truck Technology (47.0613)	
Liberal Arts/Sciences Requirements		
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Transmissions***	
7211.D1 .1	Demonstrate proper shop safety practices while repairing transmissions and drivetrains.	
7211.D1 .2	Identify tools, equipment, and pullers used in the repair of manual drive trains.	
7211.D1 .3	Identify and describe the function of manual drive train parts and components	

7211.D1 .4	Diagnose shifting related concerns.
7211.D1 .5	Disassemble, inspect, determine needed action, and reassemble manual transmissions
7211.D1 .6	Diagnose, repair, or replace air shift controls.
7211.D1 .7	Tear down, inspect, and set up a differential assembly to specifications.
7211.D1 .8	Inspect power divider assembly, determine needed action.
7211.D1 .9	Demonstrate power flow of a manual transmission and transaxle.
7211.D1 .10	Diagnosis, service, replace, and adjust a double clutch system.
7211.D1 .11	Diagnose slipping, incorrect shifting, and abnormal noise caused by the clutch system.
7211.D1 .12	Inspect flywheel and bell housing alignment
7211.D1 .13	Inspect, service, and replace universal joints, yokes, and shafts.
Domain	***Heavy Truck Engine Repair***
7211.D2.1	Demonstrate proper shop safety practices while overhauling and repairing engines.
7211.D2.2	Identify tools and equipment used in engine repair.
7211.D2.3	Inspect and determine serviceability of cylinder head according to manufacturer specifications.
7211.D2.4	Inspect and determine serviceability of cylinder block according to recommended manufacturer specifications.
7211.D2.5	Adjust or measure valve and engine brake clearance
7211.D2.6	Install camshaft according to manufacturer specifications
7211.D2.7	Inspect and install connecting rods and pistons.
7211.D2.8	Measure the crankshaft and determine serviceability.
7211.D2.9	Diagnose and or repair of the oil lubrication system.
7211.D2.10	Install piston rings according to manufacturer specifications
7211.D2.11	Inspect cooling system and components for needed repair.
7211.D2.12	Perform injector replacement procedures.

Diesel Services Capstone	
Career Cluster	Supply Chain & Transportation
Program of Study	Diesel Services
NLPS Sequence	D
Course Code	7221
Course Description	*Diesel Services Capstone further explores important skills and competencies within the Diesel Technology Pathway. Topics such as truck climate control systems, diesel engine performance, HT electrical systems, Hd truck auto transmission, and heavy truck electronics. Additionally, Co-Op and Internship opportunities will be available for students.*
Prerequisite(s)/ Corequisite(s)	Principles of Diesel Technology; Diesel Steering and Brakes; Diesel Transmission
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas Counts as a quantitative reasoning course

Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Standard Trade & Industrial: Diesel Mechanics K-12	
Rules 46-47	● Standard Trade & Industrial: Diesel Mechanics 9-12 ● Occupational Specialist I, II or III: Diesel Mechanics 9-12	
Rules 2002	● CTE: Trade & Industrial: Diesel Service Technology ● Workplace Specialist: Diesel Service Technology	
REPA/REPA 3	● CTE: Trade & Industrial Diesel Services 5-12 ● Workplace Specialist: Diesel Service 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	TRCK 142: Truck Climate Control Systems*; TRCK 219: Diesel Engine Performance I*; TRCK 224: HT Electrical Systems*; One of: TRCK 235: HD Truck Automatic Transmission*; TRCK 243: Heavy Truck Electronics III *; TRCK 280: Co-op/ Internship*	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Truck Chassis System, TC Diesel Heavy Truck Technology (47.0613)	
Liberal Arts/Sciences Requirements		
Promoted Certifications	ASE Diesel Engines	
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Engine Repair***	
7221.D1.1	Demonstrate proper shop safety practices while overhauling and repairing engines.	
7221.D1.2	Identify tools and equipment used in engine repair.	
7221.D1.3	Inspect and determine serviceability of cylinder head according to manufacturer specifications.	
7221.D1.4	Inspect and determine the serviceability of cylinder block according to recommended manufacturer specifications.	
7221.D1.5	Adjust or measure valve and engine brake clearance.	
7221.D1.6	Install camshaft according to manufacturer specifications.	
7221.D1.7	Inspect connecting rods and pistons.	
7221.D1.8	Measure the crankshaft and determine serviceability.	
7221.D1.9	Diagnose and or repair of the oil lubrication system.	

7221.D1.10	Install piston rings according to manufacturer specifications.
7221.D1.11	Install connecting rod and main bearings according to manufacturer specifications.
7221.D1.12	Assemble engine according to industry standards.
7221.D1.13	Time camshaft and components to manufacturer specifications.
7221.D1.14	Inspect cooling system and components for needed repair.
7221.D1.15	Perform injector replacement procedures.
7221.D1.16	Remove and reinstall the cylinder liner and check and adjust protrusion.
7221.D1.17	Clean engine procedures
Domain	***Engine Performance***
7221.D2.1	Demonstrate proper shop safety practices and around high-pressure fuel lines.
7221.D2.2	Identify tools used in Diesel Engine Performance.
7221.D2.3	Diagnose, test, and replace fuel system components including mechanical injectors.
7221.D2.4	Diagnose, test, and service intake and exhaust systems.
7221.D2.5	Identify key emission systems.
7221.D2.6	Use diagnostic scan tools to pull codes, set parameters, and inspect sensor values.
7221.D2.7	Diagnose, test, and service sensors and actuators.
7221.D2.8	Test, inspect, and service turbo systems.
7221.D2.9	Inspect and service engine brake systems.
7221.D2.10	Test and repair bus communication systems.
Domain	***HT Electrical Systems***
7221.D3.1	Demonstrate safe shop practices while working with electrical systems.
7221.D3.2	Identify the diagnostic equipment used for computer-controlled truck and diesel systems.
7221.D3.3	Explain and diagnose advanced truck and diesel electrical system networks.
7221.D3.4	Utilize scan tools, lab scopes, and other electronic diagnostic equipment.
7221.D3.5	Identify and access engine computer control sensors and systems.
7221.D3.6	Identify and diagnose body computer systems.
7221.D3.7	Identify and diagnose anti-lock brake and traction control systems.
7221.D3.8	Identify and diagnose advanced active and passive restraint systems.
7221.D3.9	Identify and diagnose various electrical control systems.
7221.D3.10	Identify and diagnose multi-battery starting and charging systems.
7221.D3.11	Identify and diagnose warning indicator systems, lighting, and dash gauge systems.
Domain	***HT Climate Control***
7221.D4.1	Demonstrate proper handling of refrigerants.
7221.D4.2	Identify tools and equipment used in climate control systems.
7221.D4.3	Identify all components of the heating and air conditioning system.
7221.D4.4	Explain the purpose and function of the heating and air conditioning systems.
7221.D4.5	Explain refrigeration theory.
7221.D4.6	Diagnose service and repair heating and air conditioning components.
7221.D4.7	Recover and recycle refrigerants using approved equipment.
7221.D4.8	Demonstrate knowledge of Axillary Power Units used for climate control systems.
7221.D4.9	Explain trailer refrigeration principles.

Tractor/Trailer Operation		
Career Cluster	Supply Chain & Transportation	
Program of Study	Diesel Services	
NLPS Sequence	D	
Course Code	5622	
Course Description	*Tractor/Trailer Operation is a comprehensive training program that prepares students to enter the trucking industry as an entry-level tractor-trailer operator. Instruction will include both classroom activities and behind-the-wheel driving experiences. Additional emphasis will include preventive maintenance and basic control skills training. Students are required to submit to and pass a Department of Transportation, Distribution and Logistics physical exam and drug screen. In addition,* ***students must reach their 18th birthday prior to graduation from high school in order to enroll in and complete this course.*** *Upon successful completion, students will be qualified to operate Class A Commercial Vehicles on Indiana highways.*	
Prerequisite(s)/ Corequisite(s)	Diesel Service Program of Study; or Supply Chain Management Program of Study	
Credits	2 semester course, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes	May not be used as a capstone for the CDL pathway	
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● No License Available	
Rules 46-47	● No License Available	
Rules 2002	● CTE: Trade & Industrial: Tractor/Trailer Operation ● Workplace Specialist: Tractor/Trailer Operation	
REPA/REPA 3	● CTE: Trade & Industrial Tractor/Trailer Operation 5-12 ● Workplace Specialist: Tractor/Trailer Operation 9-12	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	LOGM 102: Commercial Drivers License Application*; LOGM 103: Commercial Drivers Vehicle Operations I*; LOGM 104: Commercial Drivers Vehicle Operations II*; LOGM 180: Commercial Drivers Internship*	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary	CT CDL Plus (49.0205)	

Credential	
Liberal Arts/Sciences Requirements	
Promoted Certifications	CDL A

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Safety***
5622.D1.1	Recognize key safety principles in operating a commercial vehicle.
5622.D1.2	Distinguish between safe, defensive driving practices and those practices that increase risk to the driver and the general public.
5622.D1.3	Comply with DOT regulations by submitting to a DOT physical.
5622.D1.4	Comply with DOT regulations by taking the CDL permit exam.
5622.D1.5	Identify hazardous materials and the procedures for handling them.
Domain	***CDL Permit***
5622.D2.1	Prepare for the CDL permit exam.
5622.D2.2	Prepare for multiple endorsements available to commercial truck drivers such as articulated vehicles, air brakes, passenger, and hazardous materials.
Domain	***Truck Equipment***
5622.D3.1	Review the equipment on a commercial vehicle.
5622.D3.2	Review and summarize the pre-trip process.
5622.D3.3	Discuss the importance of the pre-trip inspection.
5622.D3.4	Explain each individual part of the pre-trip process.
Domain	***Safety and Qualifications***
5622.D4.1	Discuss and review regulations in trucking.
5622.D4.2	Review driver qualifications.
5622.D4.3	Recognize key safety principles in operating a commercial vehicle.
Domain	***Engine Controls***
5622.D5.1	Describe the engine controls as well as the primary and secondary vehicle controls.
5622.D5.2	Identify and describe the controls for starting the engine, shifting, accelerating, braking, and parking.
5622.D5.3	Explain the acceptable operating range for oil, coolant, and electrical systems.
Domain	***Vehicle Systems***
5622.D6.1	Identify and describe all vehicle instruments and their purpose.
5622.D6.2	Recognize basic vehicle construction and systems including suspensions, axles, engine, fuel, exhaust, air intake, electrical, drive train, brake, steering ad coupling systems.
5622.D6.3	Use systematic procedures to conduct accurate and efficient vehicle inspection.

Domain	Vehicle Inspection
5622.D7.1	Identify damaged, loose, or missing parts.
5622.D7.2	Recognize and report system defects.
5622.D7.3	Explain why an undiscovered malfunction or vehicle problem can be unsafe and costly.
5622.D7.4	Explain the importance of having malfunctions corrected quickly.
5622.D7.5	Review Federal Motor Carrier Safety Regulations (FMCSR) regarding vehicle inspections.
5622.D7.6	Apply procedures for performing post trip inspections.
Domain	**Vehicle Operation**
5622.D8.1	Safely practice the basic control maneuvers in a commercial vehicle.
5622.D8.2	Demonstrate how to put the vehicle in motion and how to stop the vehicle.
5622.D8.3	Demonstrate proper application of shifting patterns and procedures to efficiently perform gear shifting maneuvers.
5622.D8.4	Demonstrate the ability to back a tractor-trailer including the ability to parallel park.
5622.D8.5	Apply the step-by-step procedures used to couple and uncouple the most standard tractor-trailer combination units.
5622.D8.6	Demonstrate the skills needed to perform a safe and effective visual search while on the road.
5622.D8.7	Review the principles of basic communication as it pertains to the professional driver.
5622.D8.8	Discuss the importance of speed and space management when it comes to operating a tractor-trailer during the day or night as well as in extreme conditions.
5622.D8.9	Identify road conditions and other road users that are a potential safety threat.
5622.D8.10	Discuss the importance of methods for carrying out evasive steering, emergency stops, off road recoveries, and proper responses to brake failures and blowouts.
5622.D8.11	Review all components and regulations of railroad crossings.
5622.D8.12	Discuss conditions that cause skids, the major type of skids, and the procedures for recovering from skids.
5622.D8.13	Review the characteristics of special rigs.
Domain	**Compliance, Safety, and Accountability (CAS)**
5622.D9.1	Discuss the importance of preventive maintenance and servicing to prevent breakdown and accidents.
5622.D9.2	Discuss the importance of diagnosing and reporting vehicle malfunctions as well as the student's role in troubleshooting.
5622.D9.3	Review the importance of properly handling cargo including proper and legal securement.
5622.D9.4	Summarize the basics of freight documentation.
5622.D9.5	Describe hazardous material basics, and what responsibilities are associated with hazardous material transportation.
5622.D9.6	Explain hours of service regulations, including operating within the legal limits and accurately completing a driver's record of duty status.
5622.D9.7	Plan all aspects of the trip for having proper paperwork on hand to planning an efficient and legal route of travel.

5622.D9.8	Explain accident scene procedures as well as fire prevention.
5622.D9.9	Discuss the many security issues facing truck drivers today.
5622.D9.10	Review a variety of subjects that together make for an alert, healthy, and safe driver.
5622.D9.11	Discuss the driver's highly visible role in representing the trucking industry.
5622.D9.12	Explain Compliance, Safety, and Accountability (CAS) and how this compliance and enforcement program affects the professional driving career.
5622.D9.13	Apply the basic business concepts that are important to be successful in the transportation industry.
Domain	***Commercial Driving Internship***
5622.D10.1	Gain practical on-the-job experience in commercial truck driving.
5622.D10.2	Develop an applied knowledge of commercial truck driving.
5622.D10.3	Analyze, synthesize, and evaluate problems and information.
5622.D10.4	Apply problem solving skills using critical thinking.
5622.D10.5	Demonstrate professionalism through time management, ethics, and standards of conduct.
5622.D10.6	Prepare a professional report documenting the co-op/internship experience.

Supply Chain & Transportation Supply Chain and Logistics							
Principles		**CTE Concentrator A**		**CTE Concentrator B**		**Pathway Capstone**	
4562	Principles of Business Management	7155	Logistics Management	7142	Supply Chain Management	7258	Supply Chain Management Capstone

Principles of Business Management		
Career Cluster	Business Management; Financial Services; Marketing, Sales, & Entrepreneurship; Supply Chain & Transportation	
Program of Study	Accounting, Business Administration, Finance and Investment, Insurance, Marketing and Sales, Supply Chain and Logistics	
NLPS Sequence	A	
Course Code	4562	
Course Description	*Principles of Business Management examines business ownership, organization principles and problems, management, control facilities, administration, financial management, and development practices of business enterprises. This course will also emphasize the identification and practice of the appropriate use of technology to communicate and solve business problems and aid in decision making. Attention will be given to developing business communication, problem-solving, and decision-making skills using spreadsheets, word processing, data management, and presentation software.*	
Prerequisite(s)/ Corequisite(s)	None	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	

Rules 2002	● Business with high school setting ● CTE: Marketing with high school setting ● CTE: Business Services & Technology with high school setting ● Workplace Specialist I or II in related course approved for a CTEpathway
REPA/REPA 3	● Business 5-12 ● CTE: Business Services & Technology 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 101: Introduction to Business, OTEC 207: Integrated Microsoft Office Applications or OTEC 101: Introduction to Microcomputers
VU Course Alignment	MGMT 100: Introduction to Business, COMP 110: Introduction to Computer Concepts
Four Yr. Course Alignment	BSU – ISOM 125: Introduction to Business Computer Applications ISU - BUS 100: Introduction to Contemporary Business, BUS 180: Business Information Tools IUB - BUS X-100: Introduction to Business IUE/N/S/K - BUS W-100: Introduction to Business IUSB - BUS B-190: Introduction to Business PFW - BUS 10001: Principles of Business Administration PNW - BUSM 10100: Introduction to Business USI - MNGT 201: Survey of Management
Postsecondary Credential	ITCC - CT Business Administration, TC Business Administration (52.0201) VU - A.S. Business Administration (52.0201), A.S. Business Management (52.0101) IUB/K/N/S/SB/E – B.S. Business (52.0101) PFW – B.S. Business (52.0101) PNW – B.S. Business (52.1399) BSU – B.S. Business Administration (52.0101) ISU – B.S. Business Administration, B.S. Finance (52.0101)
Liberal Arts/Sciences Requirements	ITCC - ENGL 111: English Composition, IVYT 114: Student Success in Business, Humanities/ Social & Behavioral 3-4 hours
Promoted Certifications	
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Introduction to Business***
4562.D1.1	Identify the social, legal, economic, and ethical challenges of the business environment.
4562.D1.2	Identify management and leadership functions, and the relationship to operations and supply chain management.

4562.D1.3	Relate the characteristics of organizational structures to legal forms of business ownership including small business and entrepreneurship.
4562.D1.4	Examine the principles of short- and long-range financial planning, as well as the role of stock exchanges in the financial markets.
4562.D1.5	Analyze business issues and events related to strategic decision-making in an international and global context.
4562.D1.6	Describe the marketing mix/marketing concept and its relationship to purchasing, production, distribution, and quality.
4562.D1.7	Interpret the importance of communication and technology to the success of the organization.
4562.D1.8	List and describe the human resource functions in business.
4562.D1.9	Examine career opportunities in business.
Domain	***Business Software Applications***
4562.D2.1	Explain the purpose of information systems to support organizations and enhance productivity.
4562.D2.2	Explain the physical components and operation of microcomputers.
4562.D2.3	Use word processing, spreadsheet, database, and presentation applications to perform key business tasks.
4562.D2.4	Explain the difference between computer operating systems and user software programs.
4562.D2.5	Identify when to use appropriate features within a software application.
4562.D2.6	Utilize internet applications and “cloud” technologies in business situations.
4562.D2.7	Utilize collaboration technologies.
4562.D2.8	Explain security goals, response to threats, and safeguards.
4562.D2.9	Discuss issues related to the ethical use of information technology.
Domain	***Career Navigation***
4562.D3.1	Explore career opportunities related to the program of study and understand how they relate to the global economy and marketplace.
4562.D3.2	Understand the specialized skills needed for different career opportunities related to the program of study.
4562.D3.3	Examine licensing, certification, and credentialing requirements for different career opportunities related to the program of study.
4562.D3.4	Identify a career goal and develop an action plan, including opportunities available while in high school, for obtaining the specialized skills and credentials needed for a career related to the program of study.
Domain	***Leadership and Employability Skills***
4562.D4.1	Demonstrate professionalism by meeting expectations of promptness, attendance, being prepared, completing tasks, and following safety procedures.
4562.D4.2	Demonstrate the skills needed to successfully collaborate within teams, departments, and organizations.
4562.D4.3	Demonstrate an awareness and understanding of responsible, ethical, and professional networking.
4562.D4.4	Examine personal, wellness, and stress management strategies.
Domain	***College and Career Readiness Skills***
4562.D5.1	Demonstrate computer literacy skills and basic computer functions.

4562.D5.2	Communicate clearly, effectively, and with reason through speaking, writing, using visuals, and active listening in formal and informal settings.
4562.D5.3	Demonstrate decision-making and problem-solving skills using critical thinking and relevant math and data knowledge.
4562.D5.4	Demonstrate research, study skills, and self-learning strategies needed to be successful in a career pathway.

Logistics Management		
Career Cluster	Supply Chain & Transportation	
Program of Study	Supply Chain and Logistics	
NLPS Sequence	B	
Course Code	7155	
Course Description	*Logistics Management provides students the opportunity to explore how essential managerial functions relate to the various components of a logistics operation. Logistics concepts are approached from a manufacturing perspective with a focus on system integration and automation and lean manufacturing operations. Topics will include logistics systems, supply chain management, order, demand inventory and warehouse management, and automated components of a logistics system. Students will be prepared for the MSSC Certified Logistics Associate (CLA) and MSSC Certified Logistics Technician (CLT) certifications.*	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management	
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum	
Counts Toward	Counts as a directed elective or elective for all diplomas	
Dual Credit Status	X (PCL/CTE)	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● CTE: Trade & Industrial: Logistics ● Business with high school setting	

	● Workplace Specialist I or II in related course approved for a CTE pathway ● CTE: Marketing with high school setting ● CTE: Business & Information Technology 5-12 ● CTE: Business Services & Technology 5-12 ● Workplace Specialist: Logistics
REPA/REPA 3	● Business 5-12 ● CTE: Trade & Industrial: Logistics 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Business Services & Technology 5-12 ● Workplace Specialist: Logistics 9-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway
POSTSECONDARY AND CREDENTIAL INFORMATION	
ITCC Course Alignment	BUSN 105: Principles of Management; LOGM 127: Introduction to Logisitcs
VU Course Alignment	
Four Yr. Course Alignment	
Postsecondary Credential	ITCC - CT Supply Chain Management/ Logistics (52.0203), TC Supply Chain Management (52.0203)
Liberal Arts/Sciences Requirements	ITCC - IVYT 111: Student Success for University Transfer, COMM 101: Fundamentals of Public Speaking or COMM 102: Introduction to Interpersonal Communication
Promoted Certifications	Certified Logistics Technician (CLT)
CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Management***
7155.D1.1	Define management, managers, and the basic management functions.
7155.D1.2	Evaluate classical, behavioral, quantitative, and contemporary management theories regarding process, motivation, and expected outcomes. Distinguish between the external, task, and internal environments of organizations.
7155.D1.3	Discuss social responsibility, the meaning of ethics in the business setting, and the social audit.
7155.D1.4	Assess the roles of goals and goal setting in the planning process and identify barriers that may interfere with goal setting.
7155.D1.5	Appraise the strategic planning process and the process of strategy implementation.
7155.D1.6	Structure and support the steps in the decision-making process.
7155.D1.7	Identify and describe the major purposes for and types of forecasting techniques.
7155.D1.8	Discuss the nature of work specialization, departmentalization, and scheduling within the scope of management.

7155.D1.9	Discuss how organizational activities are coordinated and describe the management of organizational conflict.
7155.D1.10	Appraise international business practices and evaluate against cultural and political values.
Domain	***Logistics***
7155.D2.1	Understand the economic importance of logistics in both individual applications and global implications.
7155.D2.2	Understand the role of logistics in modern manufacturing.
7155.D2.3	Understand the effect of distribution in customer service relationships.
7155.D2.4	Define supply chain management and understand issues involved in creating and maintaining supply chain strategies.
7155.D2.5	Discuss the different types of information systems and their use in logistics systems.
7155.D2.6	Distinguish the basic concepts and characteristics of different forms of transportation and the influence of transportation on plant and warehouse locations.
7155.D2.7	Apply techniques and methods for effective inventory management from a lean manufacturing perspective.
7155.D2.8	Design a warehouse operation layout considering safety, material handling, automation, information systems and lean manufacturing concepts.
7155.D2.9	Discuss global implications of supply chain management and logistics systems with respect to current technology.
7155.D2.10	Explain the central components of a logistics system and their integration.
7155.D2.11	Analyze improvement opportunities for today's manufacturing logistics systems.

Supply Chain Management	
Career Cluster	Supply Chain & Transportation
Program of Study	Supply Chain and Logistics
NLPS Sequence	C
Course Code	7142
Course Description	*Supply Chain Management will build upon the knowledge and skills developed in the Logistics Management course by focusing on specific aspects of Supply Chain Management such as supply chain strategy, planning and design, customer service, purchasing, forecasting, inventory and warehouse management, as well as an in-depth study of transportation systems. Students will examine various modes of transportation and their associated characteristics, economics, and regulations.*
Prerequisite(s)/ Corequisite(s)	Principles of Business Management; Logistics Management
Credits	2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
Counts Toward	Counts as a directed elective or elective for all diplomas
Dual Credit Status	X (PCL/CTE)
Additional Notes	

ADDITIONAL COURSE INFO		
Funding	High Value	Level I
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● CTE: Trade & Industrial: Logistics ● Business with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway ● CTE: Marketing with high school setting ● CTE: Business & Information Technology 5-12 ● CTE: Business Services & Technology 5-12 ● Workplace Specialist: Logistics	
REPA/REPA 3	● Business 5-12 ● CTE: Trade & Industrial: Logistics 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Business Services & Technology 5-12 ● Workplace Specialist: Logistics 9-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	LOGM 227: Supply Chain Management; LOGM 229: Transportation Systems	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Supply Chain Management/ Logistics (52.0203), TC Supply Chain Management (52.0203)	
Liberal Arts/Sciences Requirements	ITCC - IVYT 111: Student Success for University Transfer, COMM 101: Fundamentals of Public Speaking or COMM 102: Introduction to Interpersonal Communication	
Promoted Certifications		
CONTENT STANDARDS AND COMPETENCIES		
Competency #	**Competency**	
Domain	***Supply Chain Management***	

7142.D1.1	Summarize the procedures and issues involved in supply chain strategy and planning and designing the supply chain network.
7142.D1.2	Discuss the impact of logistics on customer service.
7142.D1.3	Define the role and techniques of order processing and information systems in the supply chain.
7142.D1.4	Distinguish the basic concepts and characteristics of the different modes of transportation.
7142.D1.5	Discuss the importance and characteristics of purchasing to a business and within the entire supply chain network.
7142.D1.6	Apply techniques and methods involved in effective inventory management, warehouse management, and materials handling.
7142.D1.7	Apply techniques to maintain financial control and measurement of logistics performance.
7142.D1.8	Understand supply chain risks and barriers.
7142.D1.9	Apply Total Quality Manage to the Supply Chain.
7142.D1.10	Apply techniques and methods involved in effective global supply chain management.
Domain	***Transportation***
7142.D2.1	Describe the role and history of transportation in both public and private sector commerce.
7142.D2.2	Select the best mode of transportation given product attributes and costs associated with the selected transportation mode.
7142.D2.3	Discuss the development and operation of carrier operations in motor carriers, railroads, water carriers, air carriers, pipelines, and international transportation.
7142.D2.4	Summarize the regulations and cost structure of carrier operation in motor carriers, railroads, water carriers, air carriers, and pipelines.
7142.D2.5	Calculate costing and pricing in transportation.
7142.D2.6	Describe the importance of relationship management.
7142.D2.7	Discuss proper techniques for the negotiation and bidding process.
7142.D2.8	Explain Safety principles related to logistics.
7142.D2.9	Explain key warehousing principles such as receiving, storage, order cycle practices and inspection.
7142.D2.10	Explain order management principles such as staging, labeling, and loading.
7142.D2.11	Discuss protective packaging and materials handling.
7142.D2.12	Review hazmat documentation and MSDS.
7142.D2.13	Explain import and export control including customs and regulatory compliance.

Supply Chain Management Capstone	
Career Cluster	Supply Chain & Transportation
Program of Study	Supply Chain and Logistics
NLPS Sequence	D
Course Code	7258
Course Description	*Supply Chain Management Capstone course will build upon the knowledge and skills learned in previous courses by taking a deeper dive into Procurement, Operations*

	Management, Lean Manufacturing Systems.	
Prerequisite(s)/ Corequisite(s)	Principles of Business Management; Logistics Management; Supply Chain Management	
Credits	2 semester course, 2 semesters required, 1-3 credits per semester, 6 credits maximum	
Counts Toward	Counts as a Directed Elective or Elective for all diplomas	
Dual Credit Status	X	
Additional Notes		
ADDITIONAL COURSE INFO		
Funding	High Value	Level II
Bulletin 400	● Business Education 7-12 ● Distributive Education K-12	
Rules 46-47	● Business Education 9-12 ● Marketing Education 9-12 ● Distributive Education K-12 ● Business Education with Vocational Endorsement 9-12 ● Occupational Specialist I, II or III in related course approved for a CTE pathway	
Rules 2002	● CTE: Trade & Industrial: Logistics ● Business with high school setting ● Workplace Specialist I or II in related course approved for a CTE pathway ● CTE: Marketing with high school setting ● CTE: Business & Information Technology 5-12 ● CTE: Business Services & Technology 5-12 ● Workplace Specialist: Logistics	
REPA/REPA 3	● Business 5-12 ● CTE: Trade & Industrial: Logistics 5-12 ● CTE: Business & Information Technology 5-12 ● CTE: Business Services & Technology 5-12 ● Workplace Specialist: Logistics 9-12 ● CTE: Marketing 5-12 ● Workplace Specialist: Advanced Business Management 9-12 ● Workplace Specialist I or II in related course approved for a CTE pathway	
POSTSECONDARY AND CREDENTIAL INFORMATION		
ITCC Course Alignment	LOGM 201: Logistics Quality & Lean Management; LOGM 228: Principles of Procurement; LOGM 267: Operations Management; ACCT 101: Financial Accounting	
VU Course Alignment		
Four Yr. Course Alignment		
Postsecondary Credential	ITCC - CT Supply Chain Management/ Logistics (52.0209), TC Supply Chain Management (52.0203)	

Liberal Arts/Sciences Requirements	ITCC - IVYT 111: Student Success for University Transfer, COMM 101: Fundamentals of Public Speaking or COMM 102: Introduction to Interpersonal Communication
Promoted Certifications	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	**Competency**
Domain	***Operations Management***
7258.D1.1	Describe operations management
7258.D1.2	Develop and employ basic customer demand forecasts
7258.D1.3	Plan the timely production of goods and services
7258.D1.4	Manage the acquisition of factors of production
7258.D1.5	Manage the operations process
7258.D1.6	Plan for and manage the distribution of the resulting goods and services
7258.D1.7	Understand the need for and insure the accomplishment of quality goods and services
Domain	***Logistics Quality and Lean Management***
7258.D2.1	Demonstrate knowledge of the philosophical and historical development of quality and lean concepts.
7258.D2.2	Make comparisons of conventional operating concepts and philosophies in logistics and supply chain industries.
7258.D2.3	Demonstrate an understanding of the basic terms, disciplines, and concepts of quality and lean.
7258.D2.4	Demonstrate the ability to define, develop, and illustrate the disciplines of value stream mapping.
7258.D2.5	Identify the sources and types of waste streams in a supply chain.
7258.D2.6	Define and identify the differences between value-added and non-value activities.
7258.D2.7	Identify and explain the major advantages of quality and lean over conventional operating methods.
7258.D2.8	Explain the principles of pull systems.
7258.D2.9	Define methodologies required to achieve continuous improvement.
7258.D2.10	Define the importance and need for making a commitment to achieve the implementation of quality and lean disciplines.
7258.D2.11	Develop concepts and processes that allow supply chains the ability to remain competitive in global markets.
Domain	***Procurement***
7258.D3.1	Describe the demands placed on procurement and supply chain managers by business stakeholders.
7258.D3.2	Summarize the impact of procurement and supply chain management on the competitive success and profitability of modern organizations.
7258.D3.3	Discuss the ethical, contractual, and legal issues faced by procurement and supply chain professionals.
7258.D3.4	Summarize the increasingly strategic nature of procurement, especially the fact that procurement is much more than simply buying goods and services.
7258.D3.5	Summarize the procurement process.

7258.D3.6	Discuss supplier development, evaluation, selection, and measurement techniques.
7258.D3.7	Define appropriate techniques used to measure supplier quality.
7258.D3.8	Summarize appropriate negotiation and contract management techniques.
7258.D3.9	Describe methods to strategically manage costs in procurement management
Domain	***Accounting***
7258.D4.1	Recognize the meaning and function of accounting, its importance, and basic US accounting rules and the body most responsible for their development.
7258.D4.2	Use the accounting cycle, including analyzing and recording transactions and preparing basic financial statements in accordance with accrual accounting principles.
7258.D4.3	Account for buying and selling merchandise, including using LIFO, FIFO, and weighted average to assign values to cost of goods sold and ending inventory.
7258.D4.4	Recognize the purpose, advantages, disadvantages, and limitations of internal controls. Prepare a bank reconciliation.
7258.D4.5	Account for uncollectible accounts receivable using the allowance method.
7258.D4.6	Account for notes receivable, including interest accruals.
7258.D4.7	Account for notes payable, including interest accruals. Recognize acceptable accounting for basic payroll and other short-term liabilities.
7258.D4.8	Recognize the cost of a plant asset and use accepted method(s) to depreciate a plant asset. Account for the disposal of a plant asset. Recognize acceptable accounting for other non-current assets.
7258.D4.9	Calculate the present value of bonds at issuance and account for borrowing by issuing bonds.
7258.D4.10	Account for issuing common and preferred stock, treasury stock transactions, and for dividends.
7258.D4.11	Prepare a multi-step income statement and a classified balance sheet. Given cash pieces, prepare a statement of cash flows
7258.D4.12	Analyze a set of financial statements for profitability and liquidity.
7258.D4.13	Communicate effectively both orally and in writing, using professional, business English.