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.