

INTRODUCTION TO ADVANCED MANUFACTURING AND LOGISTICS

Introduction to Advanced Manufacturing and Logistics is a course that specializes in how people use modern manufacturing systems with an introduction to advanced manufacturing and logistics and their relationship to society, individuals, and the environment. Students apply the skills and knowledge of using modern manufacturing processes to obtain resources and change them into industrial materials, industrial products and consumer products. Students investigate the properties of engineered materials such as: metallics; polymers; ceramics; and composites. Students study six major types of material processes: casting and molding; forming; separating; conditioning; finishing; and assembling. After gaining a working knowledge of these materials, Students are introduced to advanced manufacturing, logistics, and business principles that are utilized in today's advanced manufacturing industry. Students gain a basic understanding of tooling, electrical skills, operation skills, inventory principles, MSDS's, chart and graph reading and 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.

- DOE Code: 4796
- Recommended Grade Level: 10
- Recommended Prerequisites: None
- Credits: 2 semester course, 2 semesters required, 1 credit per semester, maximum of 2 credits
- Fulfills a Directed Elective or Elective requirement for all diploma types

Application of Content

Intensive laboratory applications are a component of this course and may be either school based or work based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards-based training plan for students participating in work-based learning experiences.

Content Standards

Domain – Manufacturing

Core Standard 1 Students evaluate principles of manufacturing to assess their role in manufacturing operations and processes in logistics.

Standards

- IML-1.1 Identify the basics of product design
- IML-1.2 Explain the concepts of engineering and its importance within manufacturing
- IML-1.3 Differentiate between the various types of materials and their applications
- IML-1.4 Develop an understanding of product processing and the equipment associated with it
- IML-1.5 Explain the significance of quality control within product manufacturing
- IML-1.6 Examine the steps and process of product assembly
- IML-1.7 Explore the range of technologies available within manufacturing as a whole
- IML-1.8 Summarize how materials can be processed using tools and machines

Domain – Materials Handling

Core Standard 2 Students examine material handling in warehouses and distribution centers for a clear understanding of moving a product.

Standards

- IML-2.1 Discuss material handling, storage, and shipping methods
- IML-2.2 Analyze visual design and appearance requirements for packages
- IML-2.3 Explain size, weight, and shape requirements for packaging
- IML-2.4 Identify material handling and storage equipment
- IML-2.5 Discuss layout plans for processing packages
- IML-2.6 Identify types of warehouses and distribution centers

Domain – Introduction to Logistics

Core Standard 3 Students evaluate the history and fundamentals of logistics to understand its relation to manufacturing.

Standards

- IML-3.1 Describe the history and relevance of logistics
- IML-3.2 Examine logistic systems used for the transportation of products and services
- IML-3.3 Define terms associated with the logistics, planning, and management industries
- IML-3.4 Recognize the need for material control planning
- IML-3.5 Explore the various options and methods available for shipping/transportation
- IML-3.6 Explore value added services to improve quality and efficiency
- IML-3.7 Recognize the importance of safety, products, and people

Domain – Basic Business Principles

Core Standard 4 Students analyze business principles to make and support manufacturing and logistics decisions.

- IML-4.1 Develop a strong understanding of profits and losses
- IML-4.2 Explore the practice of marketing and explain its relevance
- IML-4.3 Illustrate the various needs for finance
- IML-4.4 Discover accounting practices and explain why they are needed
- IML-4.5 Explain why there is a need for operations in logistics
- IML-4.6 Discuss and understand business structure within advanced manufacturing and logistics

Domain – Advanced Manufacturing

Core Standard 5 Students evaluate advanced manufacturing procedures to improve processes.

- IML-5.1 Develop an awareness of process flow principles
- IML-5.2 Acquire an understanding of systems
- IML-5.3 Compile basic machine operations skills
- IML-5.4 Practice essential mechanical skills
- IML-5.5 Build an understanding of tooling
- IML-5.6 Explore machining within manufacturing industry
- IML-5.7 Develop a strong understanding of different assembly processes
- IML-5.8 Differentiate between materials

- IML-5.9 Acquire basic electrical knowledge and skills
- IML-5.10 Establish fundamental pneumatic skills
- IML-5.11 Exercise basic skills within hydraulics
- IML-5.12 Demonstrate industrial maintenance skills for use in manufacturing

Domain – Using Logistics

Core Standard 6 Students apply and adapt skills within the field of logistics to improve operations.

- IML-6.1 Explore both macro and global levels of material movement
- IML-6.2 Explains the logistics, planning, and management industries at local, state, national, and international levels
- IML-6.3 Explain the importance of production planning and workflow within logistics
- IML-6.4 Recognize the need for production control
- IML-6.5 Develop an understanding of the principles of inventory
- IML-6.6 Explore continuous improvement to increase product quality
- IML-6.7 Understand MSDS's and explain why they are important within industry
- IML-6.8 Acquire basic skills of chart and graph reading
- IML-6.9 Develop a general understanding of shipping, receiving, and processes
- IML-6.10 Establish a global understanding of markets

Domain – Safety

Core Standard 7 Students incorporate workplace and tool safety to maintain a safe work environment.

- IML-7.1 Identify hazards and apply safety methods for working in manufacturing jobs
- IML-7.2 Identify rules and laws designed to promote safety and health in the transportation, distribution, and logistics environments
- IML-7.3 Demonstrate proper use of safety equipment

Domain – Career Opportunities

Core Standard 8 Students evaluate the education, training, and certification needed for careers in advanced manufacturing and logistics.

- IML-8.5 Examine advanced manufacturing and logistics occupations and the roles and responsibilities of each
- IML-8.6 Examine licensing, certification and credentialing requirements at the national, state and local levels for careers in advanced manufacturing and logistics
- IML-8.7 Research local and regional labor market and job growth information
- IML-8.8 Identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills;
- IML-8.9 Demonstrate professional standards as required by business and industry

Career and Technical Student Organizations

Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students should be encouraged to participate in a Career and Technical Student Organization, such as **SkillsUSA** or the **Technology Student Association (TSA)**.