# Scope & Sequence

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| Course Name: Principles of Manufacturing **TSDS PEIMS Code:** 13032200 | **Course Credit:** 1.0**Course Requirements:** This course is recommended for students in grades 9-12. **Prerequisites:** None.**Recommended Prerequisites:** Algebra I or Geometry. |
| **Course Description:** In Principles of Manufacturing, students are introduced to knowledge and skills used in the proper application of principles of manufacturing. The study of manufacturing technology allows students to reinforce, apply, and transfer academic knowledge and skills to a variety of interesting and relevant activities. Students will gain an understanding of what employers require to gain and maintain employment in manufacturing careers. |
| **NOTE:** This is a suggested scope and sequence for the course content. This content will work with any textbook or instructional materials. If locally adapted, make sure all TEKS are covered. |
| **Total Number of Periods****Total Number of Minutes****Total Number of Hours** | 175 Periods7,875 Minutes131.25 Hours\* | \*Schedule calculations based on 175/180 calendar days. For 0.5 credit courses, schedule is calculated out of 88/90 days. Scope and sequence allows additional time for guest speakers, student presentations, field trips, remediation, extended learning activities, etc. |
| **Unit Number, Title, and Brief Description** | **# of Class Periods\***(assumes 45-minute periods)Total minutes per unit | **TEKS Covered****130.352. (c) Knowledge and skills** |
| **Unit 1: Introduction to Manufacturing**During this unit, students will learn to differentiate between different industry sectors such as engineering, science, manufacturing, and technology. Students will describe the history of manufacturing. Students will explore the job titles, job expectations, salaries, education needed and forecast for the industry. Students will explain the societal impact of manufacturing. Students will identify the impact of engineering and technology within global, economic, environmental, and societal contexts.  | 30 Periods1,350 Minutes | 2. The student applies manufacturing concepts to specific problems. The student is expected to:(A) distinguish between disciplines such as engineering, science, manufacturing, and technology7. The student describes the factors that affect the evolution of technology. The student is expected to:(B)evaluate how the development of technology in manufacturing is influenced by past events8. The student selects and reports on career opportunities, requirements, and expectations in manufacturing and technology. The student is expected to:(A) investigate an area of interest in manufacturing;(B) analyze the various specializations in manufacturing; and(C) describe the functions of engineers, technologists, and technicians |
| **Unit 2: Academic Knowledge and Skills for Manufacturing**This unit will include lessons on terminology and skills that are associated with mathematics and science knowledge specifically pertaining to manufacturing. Students will focus on understanding, interpreting, analyzing and knowing how to correctly use units of measure, mathematics concepts, and science principles to solve problems.  | 25 Periods1,125 Minutes | 2. The student applies manufacturing concepts to specific problems. The student is expected to:(B) use tools such as calculators and computers to solve problems; and(C) use a variety of measuring instruments3. The student applies communication, mathematics, and science knowledge and skills to manufacturing activities. The student is expected to:(A) demonstrate communication techniques consistent with industry standards;(B) locate relevant information needed to solve problems;(C) apply mathematics concepts to solve manufacturing problems;(D) analyze science principles used to solve problems; and(E) use the appropriate units of measure |
| **Unit 3: Industry Regulations, Compliance, and Workplace Safety**This unit will expose students to the important compliance, safety standards, and regulations that are implemented within this industry. Students will learn that such practices are in place to manage resources to minimize losses and liabilities to businesses in the industry. Students will explain and apply safe work practices while performing tasks. Students will determine the role of risk management in the manufacturing industry including, but not limited to, discussions focusing on liability insurance, sanitation, OSHA regulations, MSDS, emergency situations, health code, and security issues. | 30 Periods1,350 Minutes | 1. The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:(E) identify federal laws and rules applicable to the workplace and enforcement agencies such as the Equal Employment Opportunity Commission and the Occupational Safety and Health Administration (OSHA)5. The student practices safe work habits. The student is expected to:(A) master relevant safety tests based on OSHA guidelines and principles; and(B) use Material Safety Data Sheets (MSDS) to analyze, store, and safely dispose of hazardous materials. |
| **Unit 4: Commercial Equipment**During this unit students will acquire and apply basic knowledge of using and maintaining professional manufacturing equipment. Students will identify materials and resources used in manufacturing. Students will be able to demonstrate the operation of professional kitchen equipment to include, but not limited to, hand and power tools, lathes, vertical and horizontal machining centers, grinders, mills, etc.  | 30 Periods1,350 Minutes | 4. The student manufactures products using the appropriate tools, equipment, machines, materials, and technical processes. The student is expected to:(A) analyze the processes needed to complete a project such as initiate, plan, execute, monitor and control, and close; and(B) use a variety of tools and equipment to produce an item6. The student describes the importance of maintenance. The student is expected to:(A) perform maintenance on selected equipment; and(B) analyze the results of improper maintenance. |
| **Unit 5: Technology in the Workplace**During this unit, students will learn about the types of technology required to perform workplace tasks in the manufacturing industry. Students will understand how computerized systems are integral to businesses’ effectiveness and completing workplace tasks with accuracy and efficiency. Students will identify and describe the social, economic, and environmental impacts of a technological process, product, or system. Students will be able to explain the influence of technology on history and the shaping of contemporary issues.  | 30 Periods1,350 Minutes | 7. The student describes the factors that affect the evolution of technology. The student is expected to:(A) analyze how changes in technology affect manufacturing practices;(B) evaluate how the development of technology in manufacturing is influenced by past events;(C) analyze the international effects of technology;(D) demonstrate how advancements in technology have affected the field of engineering; and(E) evaluate the factors that affect the implementation of new ideas |
| **Unit 6: Employability Skills**This unit explores the professional standards and employability skills required by business and industry. Students will grow to understand that responsibility, time management, organization, positive attitude, and good character have a large impact on employability and job retention.  | 30 Periods1,350 Minutes  | 1. The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:(A) identify and comply with appropriate dress for manufacturing activities;(B) demonstrate positive work behaviors and personal qualities such as punctuality;(C) demonstrate the ability to work in teams such as developing work schedules and measuring team performance;(D) demonstrate an understanding of employers' application and interview processes; and(E) identify federal laws and rules applicable to the workplace and enforcement agencies such as the Equal Employment Opportunity Commission and the Occupational Safety and Health Administration (OSHA) |