# Scope & Sequence

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| Course Name: Construction Management II **TSDS PEIMS Code:** 13005000 | | | **Course Credit:** 2.0  **Course Requirements:** This course is recommended for students in Grades 11-12.  **Prerequisites:** Construction Management I. |
| **Course Description:** In Construction Management II, students will gain knowledge and skills needed to enter the workforce as apprentice carpenters or building maintenance supervisors' assistants or to build a foundation toward a postsecondary degree in architecture, construction science, drafting, or engineering. Construction Management II includes knowledge of the design, techniques, and tools related to the management of architectural and engineering projects. | | | |
| **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** | 350 Periods  15,750 Minutes  262.5 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**  **130.47. (c) Knowledge and Skills** | |
| **Unit 1: Construction Career Development**  This unit will help students better understand the various career opportunities within the career cluster they are interested in. Students will develop a career plan designed to achieve their career goals within this industry. Students will develop a career plan designed to achieve their career goals within this industry. | 15 Periods  675 Minutes | (28) The student investigates career opportunities, requirements, and expectations in construction technology. The student is expected to:  (A) identify an area of interest in construction and investigate its entry-level and advancement requirements and its growth potential; and  (B) describe the careers available in construction. | |
| **Unit 2: 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.  Students will learn about the types of technology required to perform workplace tasks in the Architecture and Construction industry; students will understand how computerized systems are integral to businesses’ effectiveness and completing workplace tasks with accuracy and efficiency. | 20 Periods  900 Minutes | (13) The student describes the importance of teamwork, leadership, integrity, honesty, work habits, and organizational skills. The student is expected to:  (A) describe how teams function;  (B) use teamwork to solve problems;  (C) distinguish between the roles of team leaders and team members;  (D) identify characteristics of good leaders;  (E) identify employers' expectations for appropriate work habits;  (F) define discrimination, harassment, and inequality;  (G) use time-management techniques to develop work schedules, maintain work schedules, and meet work schedule deadlines; and  (H) complete work according to established criteria. | |
| **Unit 3: 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 welding. Students will focus on understanding, interpreting, analyzing, and knowing how to correctly use units of measure, mathematics concepts, and science principles to solve problems. | 20 Periods  900 Minutes | (5) The student constructs buildings or scaled models using the appropriate tools, equipment, machines, materials, and technical processes. The student is expected to:  (A) describe the chemical, mechanical, and physical properties and standard units of measure of architectural construction materials such as concrete, masonry, and metals;  (12) The student applies communication, mathematical, and scientific knowledge and skills to construction activities. The student is expected to:  (A) write technical reports;  (B) make technical presentations to groups of individuals;  (C) use mathematical concepts in construction technology; and  (D) apply scientific principles used in construction technology.  (18) The student applies communication, science, and mathematics knowledge and skills to construction activities. The student is expected to:  (A) prepare technical reports and presentations;  (B) solve algebraic equations;  (C) solve problems in U.S. standard and metric units; and  (D) perform unit conversions. | |
| **Unit 4: Workplace Safety and Hazards**  This unit will expose students to the important compliance 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 construction industry including, but not limited to, discussions focusing on sanitation, OSHA regulations, MSDS, emergency situations, hazardous waste, and security issues. | 20 Periods  900 Minutes | (6) The student works safely with construction technology. The student is expected to:  (A) master relevant safety tests;  (B) follow safety manuals, instructions, and requirements;  (C) identify and classify hazardous materials and wastes correctly;  (D) dispose of hazardous materials and waste appropriately; and  (E) recommend improvements in safety procedures. | |
| **Unit 5: Safe Application and Maintenance of Construction Tools and Equipment**  During this unit students will acquire and apply basic knowledge of using and maintaining professional construction equipment. Students will properly identify tools and equipment used in construction. Students will be able to demonstrate the safe operation of construction equipment to include hand and power tools. Students will identify specific regulations and maintenance requirements for construction related equipment and tools. | 20 Periods  900 Minutes | (7) The student performs basic maintenance on selected construction equipment and machines. The student is expected to:  (A) maintain tools and materials correctly;  (B) perform manufacturers' maintenance procedures on selected tools, equipment, and machines; and  (C) develop a maintenance plan for selected machines and equipment.  (16) The student works safely with mechanical, fluid, electrical, and thermal technology. The student is expected to:  (A) master relevant safety tests;  (B) follow safety manuals, instructions, and requirements;  (C) identify and classify hazardous materials and wastes; and  (D) dispose of hazardous materials and wastes appropriately. | |
| **Unit 6: Industry Regulations and Compliance**  This unit will expose students to the important compliance and regulations that are implemented within this industry. Students will determine the role of risk management in the construction industry including, but not limited to, discussions focusing on OSHA, EPA, MSDS, and PPE regulations. Students will demonstrate knowledge and application of specific OSHA and EPA safety concepts, practices, and regulations on a construction site. Students will describe and explain the importance of building codes. | 20 Periods  900 Minutes | (9) The student follows the appropriate codes, laws, standards, or regulations related to architectural construction technology. The student is expected to:  (A) identify areas where codes, laws, standards, or regulations may be required;  (B) locate the appropriate codes, laws, standards, or regulations; and  (C) comply with the appropriate codes, laws, standards, or regulations. | |
| **Unit 7: Marketing**  Students will demonstrate an understanding of the concept of marketing and its importance to business. Students will compare advantages and disadvantages of different types of advertising mediums (social media, print, television, radio, free publicity, etc.). Students will formulate a plan to maintain customer loyalty, response to customer concerns and ideas, and ability to track customers. Students will create an advertising campaign to promote a business product or service. | 15 Periods  675 Minutes | (27) The student describes basic product marketing processes and techniques used in construction. The student is expected to:  (A) prepare a marketing plan for an idea, product, or service; and  (B) discuss the effect of customer satisfaction on the image of a product or company. | |
| **Unit 8: Teamwork**  Students will work collaboratively with others to achieve a goal. Students will understand that a team exists when individual strengths and skills are combined in the pursuit of a common direction or cause, to produce meaningful results for the team members and the organization. During this unit, students will learn more about the qualities and characteristics required to be successful in business and industry including time management, appropriate work habits, and meeting/exceeding employer expectations. | 20 Periods  900 Minutes | (29) The student describes the importance of teamwork, leadership, integrity, honesty, work habits, and organizational skills. The student is expected to:  (A) describe how teams function;  (B) use teamwork to solve problems;  (C) distinguish between the roles of team leaders and team members;  (D) identify characteristics of good leaders;  (E) identify employers' expectations and appropriate work habits;  (F) define discrimination, harassment, and inequality;  (G) use time-management techniques to develop and maintain work schedules and meet deadlines; and  (H) complete work according to established criteria. | |
| **Unit 9: Construction Planning**  Students will learn to describe input, processing, output, and feedback that comprise the universal systems model. Students will understand that a construction project planner begins with the end-product in mind and must synthesize the steps required to yield the anticipated result. Students will demonstrate the essential aspects of construction planning for a specific project including the identification of required activities, analysis of the implication of these activities, and choosing among the various alternative means of performing activities to complete the project. | 20 Periods  900 Minutes | (2) The student designs or modifies a structure using designated design processes and techniques. The student is expected to:  (A) develop or improve a building design that meets a specified need; and  (B) develop and communicate ideas using specified design processes.  (11) The student determines the cost of constructing a building. The student is expected to:  (A) develop a budget for a construction project; and  (B) determine the most effective strategies to minimize costs.  (15) The student uses a systems approach to investigate mechanical, fluid, electrical, and thermal systems. The student is expected to:  (A) apply the universal systems model to technological activities; and  (B) identify the inputs, processes, outputs, and feedback associated with each of the systems. | |
| **Unit 10: Construction Project Management**  Students will understand that construction project management entails overseeing the planning, design, and construction of a project, from its beginning to its end. Students will demonstrate professional construction management skills including specific activities, such as defining the responsibilities and management structure of the project management team, organizing and leading by implementing project controls, defining roles and responsibilities, developing communication protocols, and identifying elements of project design and construction likely to give rise to disputes and claims. Students will perform a pre-planned introductory construction activity applying correct safety procedures and processing operations, and appropriately using of materials and tools. Students will understand that time constraints refer to the limitations on the start and end times of each task in a project's critical path, which is the sequence of tasks that cannot be delayed without delaying the entire project. | 20 Periods  900 Minutes | (5) The student constructs buildings or scaled models using the appropriate tools, equipment, machines, materials, and technical processes. The student is expected to:  (B) describe the processes used in construction; and  (C) construct a building or a model of a building using a variety of tools, equipment, and machines.  (11) The student determines the cost of constructing a building. The student is expected to:  (A) develop a budget for a construction project; and  (B) determine the most effective strategies to minimize costs.  (26) The student knows the concept of time constants. The student is expected to:  (A) define a time constant; and  (B) distinguish between a linear and non-linear increase and decrease of a variable with time. | |
| **Unit 11: Construction Quality Control**  During this unit, students will research and discuss the different quality control applications that promote industrial and commercial standards. This unit will encompass the types of quality control systems and why quality control is essential to the production process. Students will examine and experience final production quality control and on line quality control systems. | 20 Periods  900 Minutes | (4) The student describes quality and how it is measured in construction. The student is expected to:  (A) construct items that meet a specified level of quality;  (B) recommend how the quality of a building can be improved; and  (C) explain the factors that affect the quality of buildings. | |
| **Unit 12: Problem Solving and Critical Thinking in Construction**  Students will use basic problem solving and decision making skills in every day construction duties. Students will understand that effective construction management facilitates efficient completion of projects. Students will utilize and exercise problem solving for both human performance and technical issues that arise during construction projects. | 20 Periods  900 Minutes | (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (A) apply construction technology to individual or local problems;  (B) identify the appropriate resources needed to solve problems; and  (C) describe the factors that affect the purchase and use of buildings.  (10) The student solves problems, thinks critically, and makes decisions related to architectural construction. The student is expected to:  (A) develop or improve a building or structure by following a problem-solving strategy;  (B) apply critical-thinking strategies to the analysis and evaluation of proposed technological solutions; and  (C) apply decision-making techniques to the selection of technological solutions.  (17) The student solves problems, thinks critically, and makes decisions related to construction. The student is expected to:  (A) apply problem-solving strategies;  (B) apply critical-thinking strategies; and  (C) apply decision-making techniques to the selection of technological solutions | |
| **Unit 13: Construction Technology**  During this unit, students will learn about the types of technology required to perform workplace tasks in the construction industry. Students will identify and describe the social, cultural, 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 in the construction industry. | 20 Periods  900 Minutes | (3) The student investigates emerging construction technologies. The student is expected to:  (A) report on emerging construction technologies; and  (B) conduct research in construction technology to determine its effectiveness.  (17) The student solves problems, thinks critically, and makes decisions related to construction. The student is expected to:  (D) evaluate the impact of technology on scientific thought, society, and the environment | |
| **Unit 14: Concrete**  Students will identify and describe the properties and composition of different types of concrete distinguished by the proportions of main ingredients including cement, mineral and chemical admixtures, reinforcement, aggregates, and water. Students will understand the role concrete plays in the foundational integrity of a structure as footings or foundations. Students will demonstrate the process of depositing, spreading, consolidating and striking off concrete in a form. | 20 Periods  900 Minutes | (14) The student gains knowledge about the ingredients of concrete, various types of concrete, and methods to mix concrete. The student is expected to:  (A) identify the properties of cement;  (B) describe the composition of concrete;  (C) perform volume estimates for concrete quantity requirements;  (D) describe types of concrete reinforcement materials;  (E) describe various types of footings and explain their uses;  (F) identify the parts of various types of forms;  (G) explain the safety procedures associated with the construction of concrete forms; and  (H) explain how to erect, plumb, and brace a simple concrete form with reinforcement. | |
| **Unit 15: Motion and Momentum**  Students will understand that **motion** is a change from one place to another while **momentum** is the product of an objects’ mass and velocity while in motion. Students will create free-body diagrams that are used to show the relative magnitude and direction of all forces acting upon an object in each situation. Students will differentiate between linear and angular momentum relative to conservation and motion. | 20 Periods  900 Minutes | (19) The student knows the laws governing motion. The student is expected to:  (A) analyze examples of uniform and accelerated motion, including linear, projectile, and circular motion;  (B) evaluate the effects of forces on the motion of objects;  (C) develop a free-body diagram for force analysis; and  (D) analyze motion relative to different frames of reference.  (20) The student knows the concept of momentum. The student is expected to:  (A) identify linear and angular momentum; and  (B) relate the conservation of momentum to linear and angular motion. | |
| **Unit 16: Waves and Vibration**  Students will analyze the properties and applications of waves. Students will investigate the properties of waves. Students will understand the transfer of energy through different mediums. Students will explain the processes that result in the production and energy transfer. Students will experimentally determine the behavior of waves in various media in terms of reflection, refraction, and diffraction of waves. | 20 Periods  900 Minutes | (21) The student knows the concept of waves and vibrations. The student is expected to:  (A) evaluate characteristics of wave motion; and  (B) demonstrate how waves transmit energy. | |
| **Unit 17: Energy**  Students will evaluate and relate the flow and transformations of energy within a system. Students will analyze, evaluate, and apply the principle of conservation of energy and measure the components of work-energy theorem by describing total energy in a closed system and identifying different types of potential and kinetic energy. Students will identify transducers that transfer one form of energy to another. Students will describe radiant energy as the [energy](https://en.wikipedia.org/wiki/Energy) of [electromagnetic](https://en.wikipedia.org/wiki/Electromagnetic_radiation) and [gravitational radiation](https://en.wikipedia.org/wiki/Gravitational_radiation). Students will understand that both fission and fusion are nuclear processes by which atoms are altered to create energy but fission produces a large number of radioactive particles. Students will compare and contrast the different types of radioactive decay including alpha, beta, and gamma. | 20 Periods  900 Minutes | (22) The student knows the concept of energy conversion. The student is expected to:  (A) evaluate the purpose of energy converters;  (B) identify converters that change one form of energy to another; and  (C) evaluate the efficiency of converting energy from one form to another.  (23) The student knows the concept of energy transduction. The student is expected to:  (A) identify the function of a transducer;  (B) distinguish between an energy converter and a transducer; and  (C) identify transducers that change energy signals from one form to another.  (24) The student knows the concept of radiant energy. The student is expected to:  (A) describe radiation;  (B) compare fission and fusion in terms of end products, energy, advantages, and availability; and  (C) compare and contrast different types of radioactive decay. | |
| **Unit 18: Light and Optics**  Students will qualitatively relate the energy of electronic transitions to the specific color of light observed. Students will understand that optics, a branch of physics, involves the behavior and properties of light including interactions with matter. Students will differentiate between optics that usually describe the behavior of [visible](https://en.wikipedia.org/wiki/Visible_light), [ultraviolet](https://en.wikipedia.org/wiki/Ultraviolet), and infrared light. Students will understand that because light is an [electromagnetic wave](https://en.wikipedia.org/wiki/Electromagnetic_wave), other forms of [electromagnetic radiation](https://en.wikipedia.org/wiki/Electromagnetic_radiation) such as [X-rays](https://en.wikipedia.org/wiki/X-ray), [microwaves](https://en.wikipedia.org/wiki/Microwave), and [radio waves](https://en.wikipedia.org/wiki/Radio_wave) exhibit similar properties. Students will interpret [rays](https://en.wikipedia.org/wiki/Ray_(optics)) that travel in straight lines and bend when they pass through or reflect from surfaces through reflection, refraction, and interference. | 20 Periods  900 Minutes | (25) The student knows the concept of light and optics. The student is expected to:  (A) identify characteristics of optical devices;  (B) analyze the characteristics of light, including reflection, refraction, and interference; and  (C) interpret the effects of wave characteristics in daily applications such as lasers and optics in industrial and medical technology. | |