# Scope & Sequence

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| Course Name: Construction Management I **TSDS PEIMS Code:** 13004900 | | | **Course Credit:** 2.0  **Course Requirements:** This course is recommended for students in Grades 10-12.  **Prerequisites:** None.  **Recommended Prerequisites:** Algebra I, Geometry, and Principles of Construction. |
| **Course Description:** In Construction Management I, 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 I includes the knowledge of 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**  **130.46. (c) Knowledge and Skills** | |
| **Unit 1: Introduction to Construction Management**  This unit is designed to acquaint students with construction occupations. Students will explain the knowledge of the history and traditions of the building trades. Students will research, describe, and examine the history of construction by utilizing technology, collaboration, and other sources. Students will focus on expanding their knowledge about the education, training, and/or certification required to obtain employment in the construction industry. Students will develop a career plan designed to achieve their career goals within this industry. | 20 Periods  900 Minutes | (5) The student selects and uses the proper construction technology to meet practical objectives. The student is expected to:  (A) distinguish between architectural and civil construction systems; and  (D) identify and describe the roles of construction.  (15) The student identifies the factors that influence the evolution of construction technology. The student is expected to:  (B) describe how the evolution of construction technology has been influenced by past events  (29) The student investigates career opportunities, requirements, and expectations in construction technology. The student is expected to:  (A) describe an area of interest in construction and investigate its entry-level requirements and advancement opportunity requirements and its growth potential; and  (B) identify the careers available in construction technology. | |
| **Unit 2: Interpreting Construction Drawings**  Students will differentiate between the different building trades’ plans and specifications. Students will demonstrate the use of the alphabet of lines and read and interpret basic codes. Students will compare differences in symbols and abbreviations between the building trades including electrical, mechanical, and plumbing. Students will read and interpret plans, elevations, schedules, sections, and details contained on basic construction drawings. Students will develop a materials takeoff based on architectural, engineering, and shop drawings. | 20 Periods  900 Minutes | (22) The student learns how to interpret architectural and engineering working drawings and specifications. The student will become familiar with the symbols and nomenclature specific to the construction industry. The student is expected to:  (A) describe the types of drawings usually included in a set of plans;  (B) identify the different types of lines used on construction drawings;  (C) identify selected architectural symbols commonly used to represent materials on plans;  (D) identify selected electrical, mechanical, and plumbing symbols commonly used on plans;  (E) identify selected abbreviations commonly used on plans;  (F) read and interpret plans, elevations, schedules, sections, and details contained in basic construction drawings;  (G) state the purpose of written specifications; and  (H) demonstrate or describe how to perform a quantity takeoff for materials.  (2) The student applies academic skills to the requirements of construction management. The student is expected to:  (D) read and interpret appropriate architectural symbols, schematics, blueprints, work drawings, manuals, and bulletins; and  (E) apply descriptive geometry related to auxiliary views, revolutions, intersections, and piping drawings. | |
| **Unit 3: Construction Materials**  Students will compare and contrast between different types of building materials and their functionality. Students will be able to identify lumber by type and grade and describe what they are used for. Students will learn about construction techniques using various fasteners, anchors, and adhesives. Students will be able to determine types and quantities of building materials required for project(s) by analyzing construction schedule(s). | 20 Periods  900 Minutes | (3) The student gains knowledge about building materials used in the construction industry, including lumber, sheet materials, engineered wood products, structural concrete, structural steel, fasteners, and adhesives used in construction settings. The student is expected to:  (A) identify various types of construction materials and methods;  (B) describe the uses of various types of hardwoods and softwoods;  (C) identify the grades and markings of wood building materials;  (D) describe the proper method of storing and handling building materials;  (E) describe the uses of various types of engineered lumber;  (F) calculate quantities of lumber and wood products using industry-standard methods; and  (G) describe the fasteners, anchors, and adhesives used in construction work.  (9) The student builds buildings or structures using the appropriate tools, equipment, machines, materials, and technical processes. The student is expected to:  (A) describe the chemical, mechanical, and physical properties of construction materials;  (18) The student knows the concepts and skills that form the technical knowledge of building carpentry. The student is expected to:  (A) identify the uses of carpentry hardware and fasteners; and | |
| **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 | (10) The student works safely with construction tools, equipment, machines, and materials. 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.  (19) The student knows the function and application of the tools, equipment, technologies, and materials used in construction carpentry. The student is expected to:  (B) handle and dispose of environmentally hazardous materials used in carpentry in the proper manner | |
| **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 | (19) The student knows the function and application of the tools, equipment, technologies, and materials used in construction carpentry. The student is expected to:  (A) use hand tools, power tools, and equipment commonly employed in carpentry in a safe manner;  (21) The student knows the proper and safe use of hand and power tools. The student is expected to:  (A) identify the hand tools commonly used by carpenters and describe their uses;  (B) use hand tools safely;  (C) state the general safety rules for operating all power tools, regardless of type;  (D) identify the portable power tools commonly used by carpenters and describe their uses; and  (E) use portable power tools safely.  (11) The student describes the importance of maintenance in construction. The student is expected to:  (A) maintain tools and materials correctly;  (B) perform manufacturers' maintenance procedures on selected tools, equipment, and machines; and  (C) describe the results of negligent or improper maintenance. | |
| **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 | (13) The student applies the appropriate codes, laws, standards, or regulations related to construction technology. The student is expected to:  (A) explain the importance of codes, laws, standards, or regulations related to construction technology;  (B) identify areas where codes, laws, standards, or regulations related to construction technology may be required; and  (C) comply with appropriate codes, laws, standards, or regulations.  (18) The student knows the concepts and skills that form the technical knowledge of building carpentry. The student is expected to:  (B) demonstrate knowledge of fire ratings of construction materials | |
| **Unit 7: 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 in order to complete the project. | 20 Periods  900 Minutes | (9) The student builds buildings or structures using the appropriate tools, equipment, machines, materials, and technical processes. The student is expected to:  (B) describe the processes used in construction; and  (2) The student applies academic skills to the requirements of construction management. The student is expected to:  (C) estimate jobs, schedules, and industry standards related to legal restrictions;  (4) The student describes how a systems model can be used to describe construction activities, including mechanical, fluid, electrical, and thermal systems. The student is expected to:  (A) apply the universal systems model to construction activities;  (B) identify the inputs, processes, outputs, and feedback associated with construction systems;  (C) describe the subsystems used in construction; and  (D) describe how technological systems interact to achieve common goals.  (6) The student designs an item for construction using appropriate design processes and techniques. The student is expected to:  (A) describe the design processes and techniques used in construction;  (5) The student selects and uses the proper construction technology to meet practical objectives. The student is expected to:  (C) describe the factors that affect the purchase and use of constructed items; and  (14) The student describes the intended and unintended effects of technological solutions. The student is expected to:  (D) describe the issues related to regional and community planning. | |
| **Unit 8: 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 demonstrate basic construction skills when completing a project including scaffolding, framing, drywall application, exterior coverings, and door/window/trim installation. | 20 Periods  900 Minutes | (2) The student applies academic skills to the requirements of construction management. The student is expected to:  (B) complete work orders and related paperwork;  (12) The student manages a construction project. The student is expected to:  (A) develop a plan for completing a construction project; and  (B) participate in the organization and operation of a real or simulated construction project using project management processes, including initiating, planning, executing, monitoring and controlling, and closing a project.  (17) The student identifies the factors that influence the cost of goods and services in construction projects. The student is expected to:  (A) develop a budget for a construction project; and  (B) determine the most effective strategies to minimize costs.  (28) The student describes basic product marketing processes and techniques used in construction. The student is expected to prepare a marketing plan for an idea, product, or service.  (9) The student builds buildings or structures using the appropriate tools, equipment, machines, materials, and technical processes. The student is expected to:  (C) construct buildings or structures using a variety of tools, equipment, and machines  (19) The student knows the function and application of the tools, equipment, technologies, and materials used in construction carpentry. The student is expected to:  (C) use the different types of scaffolding employed in building carpentry in a safe manner  (20) The student applies the concepts and skills of the construction industry to simulated or actual work situations. The student is expected to:  (A) square, measure, and cut materials to specified dimensions;  (B) handle different types of loads;  (C) use framing techniques for walls, floors, ceilings, rafters, structural timbers, stairs, trusses, and fireproof metal-studs;  (D) demonstrate the proper principles of drywall application; and  (E) install doors, windows, interior and exterior wall covering, and trim. | |
| **Unit 9: 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 | (8) The student describes quality and how it is measured in construction. The student is expected to:  (A) describe different quality control applications in construction; and  (B) apply continuous quality improvement techniques to the construction of a building or structure. | |
| **Unit 10: Problem Solving 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 | (5) The student selects and uses the proper construction technology to meet practical objectives. The student is expected to:  (B) apply construction technology to individual or community problems;  (6) The student designs an item for construction using appropriate design processes and techniques. The student is expected to:  (B) develop or improve a building or structure that meets specified needs; and  (C) identify areas where quality, reliability, and safety can be designed into a building or structure.  (16) The student solves problems, thinks critically, and makes decisions related to construction technology. The student is expected to:  (A) develop or improve a building or structure by following a problem-solving strategy; and  (B) apply critical-thinking strategies to analyze and evaluate proposed technological solutions. | |
| **Unit 11: 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 | (14) The student describes the intended and unintended effects of technological solutions. The student is expected to:  (A) apply an assessment strategy to determine the risks and benefits of technological developments in construction;  (B) describe how technology has affected individuals, societies, cultures, economies, and environments;  (C) discuss the international effects of construction technology; and  (15) The student identifies the factors that influence the evolution of construction technology. The student is expected to:  (A) describe how changes in construction technology affect business and industry; and  (7) The student investigates emerging and innovative construction technologies. The student is expected to:  (A) report on emerging and innovative construction technologies; and  (B) conduct research and experimentation in construction technology.  (19) The student knows the function and application of the tools, equipment, technologies, and materials used in construction carpentry. The student is expected to:  (D) demonstrate knowledge of new and emerging technologies that may affect construction carpentry. | |
| **Unit 12: Flooring Systems**  Students will understand that framing is designed to work in conjunction with foundation to provide structural strength, stability, and support. Students will understand that framing systems typically consist of the roof structure that supports the roof deck, exterior and interior load-bearing walls, beams, girders, posts, and floor framing. Students will demonstrate proper installation of floor assembly including bridging, joists, subfloor, and single floor system and use proper fastening techniques. Students will demonstrate knowledge about different floor covering materials including hard (e.g. tile), soft (e.g. carpet), and resilient (e.g. vinyl) types. Students will explore the unique characteristics, advantages, and disadvantages of various flooring types as well as proper care, maintenance, and repair for each type of floor covering. Students will demonstrate proper and safe use of tools used during flooring installation including wet saw, trowels, and carpet knives. | 20 Periods  900 Minutes | (23) The student gains knowledge about the basics of wood framing, including layout and construction of wood-framed floor systems using common and engineered lumber. The student is expected to:  (A) identify the different types of framing systems;  (B) interpret drawings with specifications to determine floor system requirements;  (C) identify framing and support members as it refers to flooring;  (D) name the methods used to fasten sills to the foundation;  (E) given specific floor load and span data, select the proper girder and beam size from a list of available girders and beams;  (F) list and recognize different types of bridging;  (G) list and recognize different types of flooring materials;  (H) explain the purposes of subflooring and underlayment;  (I) select the appropriate fasteners to be used in various floor-framing systems;  (J) estimate the amount of material needed to frame a floor assembly; and  (K) demonstrate the ability to lay out and construct a floor assembly, including installing bridging; installing joists for a cantilever-floor; installing a subfloor using butt-joint plywood or oriented strand board panels; and installing a single floor system using tongue-and-groove plywood or oriented strand board panels. | |
| **Unit 13: Framing**  Students will understand that framing systems typically consist of the roof structure that supports the roof deck, exterior and interior load-bearing walls, beams, girders, posts, and floor framing. Students will describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and firestops. Students will identify methods used to secure framing systems including where the most critical connections exist, where the roof system connects to supporting walls, where walls connect to each other at floor levels, and where walls connect to the foundation. Students will plan, lay out, assemble, erect, brace, and sheath wall(s). | 20 Periods  900 Minutes | (24) The student understands how to lay out and frame walls and ceilings, rough-in door and window openings, construct corners and partition tee-bracing walls and ceilings, and apply sheathing. The student is expected to:  (A) identify the components of a wall and ceiling layout;  (B) describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and fire stops;  (C) describe the correct procedure for assembling and erecting an exterior wall;  (D) identify the common materials and methods for installing sheathing on walls;  (E) describe or demonstrate how to lay out, assemble, erect, and brace exterior walls for a frame building;  (F) describe wall-framing techniques used in masonry construction;  (G) explain the use of metal studs in wall framing;  (H) explain how to cut and install ceiling joists on a wood frame building; and  (I) estimate the materials required for frame walls and ceilings. | |
| **Unit 14: Roofing**  Students will identify roof framing components, and describe the use of the parts to frame a gable and hip roof including trusses and rafters. Students will plan, lay out, assemble, erect, and brace a gable roof with vent openings using trusses. Students will develop estimates for the materials required for roof framing projects. Students will identify the common materials used to install roofing on gable and hip roofs such as shingles, underlayment, flashing, etc. Students will demonstrate layout, proper cutting, and safe installation of fiberglass and wood shingles on gable and hip roofs including main and hip ridge caps, and a cricket or saddle. Students will learn how to close-up valleys and make roofs watertight. | 20 Periods  900 Minutes | (25) The student investigates various types of framed roofs. The student is expected to:  (A) demonstrate an understanding of the terms associated with roof framing;  (B) identify the roof-framing members used in gable and hip roofs;  (C) identify the methods used to calculate the length of a rafter;  (D) identify the various types of trusses used in roof framing;  (E) use a framing square, speed square, and calculator in laying out a roof;  (F) identify various types of sheathing used in roof construction;  (G) frame or describe how to frame a gable roof with vent openings;  (H) erect, or describe how to erect, a gable roof using trusses;  (I) frame, or describe how to frame, a roof opening; and  (J) estimate the materials used for framing and sheathing a roof. | |
| **Unit 15: Windows, Doors, and Skylights**  Students will identify various types of fixed, sliding, and swinging windows. Students will demonstrate the ability to install windows following proper protocol and associated hardware such as keeper and security hinges. Students will identify common types of exterior doors such as entry, sliding, French, storm, etc. Students will demonstrate proper door installation and associated hardware including hinges, locksets, deadbolts, and peep holes. | 20 Periods  900 Minutes | (26) The student describes various types of windows, skylights, and exterior doors. The student is expected to:  (A) identify various types of fixed, sliding, and swinging windows;  (B) identify the parts of a window installation;  (C) state the requirements for proper window installation;  (D) explain how to install a pre-hung window;  (E) identify the common types of exterior doors and explain how they are constructed;  (F) identify the parts of a door installation;  (G) identify types of thresholds used with exterior doors;  (H) install, or explain the procedure to install, a pre-hung exterior door;  (I) identify the various types of locksets used on exterior doors and explain how the locksets are installed;  (J) install a lockset; and  (K) identify and explain the use and installation of various other door and window hardware, including security hinges, keepers, deadbolts, and peep holes. | |
| **Unit 16: Stairways**  Students will identify the parts of stairs including the step, tread, riser, nosing, stringer, winders, trim, banister, base rail, and fillet. Students will differentiate between types of stairs such as straight, quarter turn (L-shape), half turn (U-shape), winder, spiral, curved, and ladders. Students will interpret drawings of stairs to plan, lay out, assemble, erect, and brace a small stair unit with temporary handrail. | 20 Periods  900 Minutes | (27) The student describes various types of stairs and the common building code requirements related to stairs. The student is expected to:  (A) identify the various types of stairs;  (B) identify the various parts of stairs;  (C) identify the materials used in the construction of stairs;  (D) interpret construction drawings of stairs; and  (E) calculate the total rise, number and size of risers, and the number and size of treads required for a given stairway. | |
| **Unit 17: 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. | 15 Periods  675 Minutes | (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (A) identify employment opportunities, including entrepreneurship and career preparation requirements, in the field of construction management;  (B) demonstrate an understanding of group participation and leadership related to career preparation;  (C) identify employers' expectations, including appropriate work habits;  (D) apply the competencies related to resource technology in appropriate settings; and  (E) demonstrate knowledge of the concepts and skills related to health and safety in the workplace, as specified by appropriate governmental regulations.  (2) The student applies academic skills to the requirements of construction management. The student is expected to:  (A) demonstrate effective verbal and written communication skills with individuals from varied cultures, including fellow workers, managers, and customers | |
| **Unit 18: Leadership Development**  During this unit, students will learn more about the qualities and characteristics required to be successful in business and industry. While a basic understanding and development of employability skills will help students obtain employment, they will learn that developing leadership skills will aid them in job retention and potential promotion opportunities. 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 understand the professional ethics legal responsibilities pertaining to the construction industry. | 15 Periods  675 Minutes | (30) 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) describe the use of 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; and  (G) describe the use of time-management techniques to develop and maintain work schedules and meet deadlines. | |