# Scope & Sequence

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| Course Name: Construction Technology I **TSDS PEIMS Code:** 13005100 | | | **Course Credit:** 2.0  **Course Requirements:** This course is recommended for students in Grades 10-12.  **Prerequisites:** None.  **Recommended Prerequisites:** Principles of Construction or Principles of Architecture. |
| **Course Description:** In Construction Technology I, students will gain knowledge and skills needed to enter the workforce as carpenters or building maintenance supervisors or to prepare for a postsecondary degree in construction management, architecture, or engineering. Students will acquire knowledge and skills in safety, tool usage, building materials, codes, and framing. For safety and liability considerations, limiting course enrollment to 15 students is recommended. | | | |
| **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**  **130.48 Knowledge and Skills** | |
| **Unit 1: 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 | 1. The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (A) explain the role of an employee in the construction industry;  (B) apply critical-thinking skills;  (C) demonstrate the ability to solve problems using critical-thinking skills;  (D) demonstrate knowledge of basic computer systems;  (E) explain common uses for computers in the construction industry;  (F) define effective relationship skills; and  (G) recognize workplace issues such as sexual harassment, stress, and substance abuse | |
| **Unit 2: Career Development**  Students will identify interests, abilities, aptitudes, values, and personality traits as they relate to career planning, to develop a keen understanding of the value and benefit of work, and to differentiate between jobs and careers. This unit will help students better understand the various career opportunities within the Architecture and Construction industry. Students will develop a career plan designed to achieve their career goals within this industry. Students will explore the job titles, job expectations, salaries, education needed and forecast for the industry. | 20 Periods  900 Minutes | 3. The student identifies various opportunities in the field of carpentry and the characteristics a carpenter should possess. The student is expected to:  (A) identify job opportunities and their accompanying job duties such as carpentry, building maintenance supervisor, architect, and engineer; and  (B) research careers along with the education, job skills, and experience required to achieve them | |
| **Unit 3: Building 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 | 4. The student gains knowledge about building materials used in the construction industry. The student is expected to:  (A) identify various types of building materials and their uses;  (B) state the uses of various types of hardwoods and softwoods;  (C) identify the different grades and markings of wood building materials;  (D) describe the proper method of storing and handling building materials;  (E) state the uses of various types of engineered lumber;  (F) calculate the quantities of lumber and wood products using industry-standard methods; and  (G) describe the fasteners, anchors, and adhesives used in construction work and explain their uses | |
| **Unit 4: 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 determine the role of risk management in the architecture and construction industry including, but not limited to, discussions focusing on liability insurance, sanitation, OSHA and EPA regulations, emergency situations, PPE, building code, MSDS, HazCom, and security issues. | 30 Periods  1,350 Minutes | 2. The student understands that safe working standards are imperative in the classroom and in the field. The student is expected to:  (A) explain the idea of a safety culture;  (B) explain the importance of a safety culture in the construction crafts;  (C) explain the role of Occupational Safety and Health Administration (OSHA) in job-site safety;  (D) explain fall protection, ladder safety, stair safety, and scaffold safety procedures;  (E) explain the importance of hazard communication (HazCom);  (F) explain the importance of Safety Data Sheets (SDS);  (G) explain OSHA's General Duty Clause;  (H) explain OSHA 1926 CFR Subpart C;  (I) identify causes of accidents;  (J) identify impacts of accident costs;  (K) identify struck-by hazards;  (L) identify caught-in-between hazards;  (M) identify other construction hazards on the jobsite, including hazardous material exposures, environmental elements, welding and cutting hazards, confined spaces, and fires;  (N) define safe work procedures around electrical hazards;  (O) define hazard recognition;  (P) define risk assessment techniques; and  (Q) demonstrate the use and care of appropriate personal protective equipment, including safety goggles and glasses, hard hats, gloves, safety harnesses, and safety shoes | |
| **Unit 5: Tools and Equipment**  During this unit students will acquire and apply basic knowledge of using and maintaining construction-related tools and equipment. Students will identify and be able to demonstrate the operation of construction tools and equipment to include, but not limited to, hammers, saws, levels, puller, clamps, drills, grinders, sanders, etc. Demonstrate the professional and safe use of basic tools and equipment used in the building trades. Students will identify specific regulations and maintenance requirements for construction related equipment and tools. | 25 Periods  1,125 Minutes | 5. The student applies the proper and safe use of hand and power tools associated with carpentry. The student is expected to:  (A) identify the hand tools commonly used by carpenters and describe their uses;  (B) use hand tools in a safe and appropriate manner;  (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 in a safe and appropriate manner | |
| **Unit 6: Drafting and Design**  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. | 25 Periods  1,125 Minutes | 6. The student interprets architectural and engineering working drawings and specifications. The student is expected to:  (A) describe the types of drawings usually included in a set of plans and list the information found on each type;  (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;  (H) identify and describe the parts of a specification; and  (I) demonstrate or describe how to perform a quantity takeoff for materials | |
| **Unit 7: 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. | 35 Periods  1,575 Minutes | 10. The student knows 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;  (D) identify types of concrete reinforcement materials and describe their uses;  (E) identify various types of footings and explain their uses;  (F) identify the parts of various types of concrete forms;  (G) explain the safety procedures associated with the construction and use of concrete forms; and  (H) erect, plumb, and brace a simple concrete form with reinforcement | |
| **Unit 8: Basic Framing I – Wood-Framed Floor Systems**  Students will understand that framing is designed to work in conjunction with foundation to provide structural strength, stability, and support. Students will identify the different types of framing systems including roof deck, exterior/interior walls, beams, girders, posts, and floor framing. Students will learn that Floor framing consists of a system of sills, beams, girders, joists, and subflooring, all properly sized and connected together. Students will demonstrate proper installation of floor assembly including bridging, joists, subfloor, and single floor system and use proper fastening techniques. | 35 Periods  1,575 Minutes | 7. The student gains knowledge of wood framing and the 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) read and interpret drawings and specifications to determine floor system requirements;  (C) identify floor and sill framing and support members;  (D) name the methods used to fasten sills to the foundation;  (E) select the proper girder or beam size from a list of available girders or beams given specific floor load and span data;  (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;  (K) lay out and construct a floor assembly;  (L) install bridging;  (M) install joists for a cantilever-floor;  (N) install a subfloor using butt-joint plywood or oriented strand board panels; and  (O) install a single floor system using tongue-and-groove (T&G) plywood or oriented strand board (OSB) panels | |
| **Unit 9: Basic Framing II – Walls, Ceilings, Doors, and Windows**  Students will identify wall and ceiling framing components and describe the use of the parts to frame a wall, door and window openings. Students will plan, lay out, assemble, erect, and brace exterior wall(s) including plates, corner posts, door and window openings, partition Ts, bracing and plan for installation of fire stops. Students will develop estimates for the materials required for wall and ceiling framing projects. | 35 Periods  1,575 Minutes | 8. The student knows how to lay out and frame walls and ceilings, rough-in door and window openings, construct corners and partition Ts, brace 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 the installation of plates, corner posts, door and window openings, partition Ts, bracings, and firestops;  (C) describe the correct procedure for assembling and erecting an exterior wall;  (D) identify the common materials and methods used for installing sheathing on walls;  (E) 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) cut and install ceiling joists on a wood frame building; and  (I) estimate the materials required for frame walls and ceilings | |
| **Unit 10: Basic Framing III - Roofs**  Students will demonstrate the use of common framing tools such as framing square, speed square, and calculator. 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. | 35 Periods  1,575 Minutes | 9. The student gains knowledge of various types of framed roofs and how to frame these roofs using both stick-build and truss-build systems. 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 a gable roof with vent openings;  (H) erect a gable roof using trusses;  (I) frame a roof opening; and  (J) estimate the materials used for framing and sheathing a roof | |
| **Unit 11: 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, peep holes. | 35 Periods  1,575 Minutes | 11. The student gains knowledge of 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) 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 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 door and window hardware, including security hinges, keepers, deadbolts, and peep holes | |
| **Unit 12: 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. | 35 Periods  1,575 Minutes | 12. The student is introduced to 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;  (E) calculate the total rise, number and size of risers, and the number and size of treads required for a given stairway;  (F) lay out and cut stringers, risers, and treads; and  (G) build a small stair unit with a temporary handrail | |