CareerClusters™ PATHWAYS TO COLLEGE & CAREER READINESS
Architecture & Construction

Learning that works for Colorado CTE®

Colorado CTE Course – Scope and Sequence

Course Name	**Principles of Construction**	**Course Details** **Course = 0.50 Carnegie Unit Credit**	**Credit: 0.5** **Prerequisites: None**
Course Description	Principles of Construction is a foundational course in the Architecture & Construction cluster covering essential knowledge, skills, and concepts required for careers in construction. Upon completion of this course, proficient students will be able to describe various construction fields and outline the steps necessary to advance in specific construction careers. Students will be able to employ tools safely and interpret construction drawings to complete projects demonstrating proper measurement and application of mathematical concepts. Standards in this course also include an overview of the construction industry and an introduction to building systems and materials.		
Note:	This is a suggested scope and sequence for the course content. The content will work with any textbook or instructional resource. If locally adapted, make sure all essential knowledge and skills are covered.		
SCED Identification #	17002	Schedule calculation based on 60 calendar days of a 90-day semester. Scope and sequence allows for additional time for guest speakers, student presentations, field trips, remediation, or other content topics.	

All courses taught in an approved CTE program must include Essential Skills embedded into the course content. The Essential Skills Framework for this course can be found at **https://www.cde.state.co.us/standardsandinstruction/essentialskills**

Instructional Unit Topic	Suggested Length of Instruction	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration
Professional Standards/Employability Skills		Understand the nature and scope of the Architecture &Construction Career Cluster and the role architecture and construction play in society and the economy. Understand the roles and responsibilities among trades and professions, including labor/management relationships.	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;	Evaluate jobs data and employment projections in the construction industry from sources such as O*Net OnLine, synthesizing findings from each source. • Determine areas of largest growth within the construction industry and discuss the significance of construction to the national and global economy.	SkillsUSA Personal Skills SkillsUSA 4 Pillars Updates to Student ICAP

		Evaluate a wide range of career pathway opportunities for success in architecture and construction careers.	(B) demonstrate critical-thinking skills; (C) demonstrate the ability to solve problems using critical-thinking skills; (D) define effective relationship skills for the workplace; (E) recognize workplace issues such as sexual harassment, stress, and substance abuse; (F) explain the Occupational Safety and Health Administration (OSHA) General Duty Clause; (G) explain OSHA 1926 CFR Subpart C.; and (H) understand contractual relationships with all parties involved in the building process to ensure successful build of a project.	• Report job requirements and characteristics for selected careers and compare personal interests and aptitudes with job requirements and characteristics of the career selected. Define employment expectations of entry-level employees in local employment situations (hiring requirements, basic job expectations, etc.) Obtain OSHA 10 certificate and be able to state basic safety requirements for the industry. Explain roles and relationships of entities within the industry (i.e. relationships of unions, contractors, owners, associations, OSHA, etc.) Demonstrate skills necessary to obtain employment: • Create an industry appropriate resume • Navigate online job posting tools and complete an employment application	

				Research basic regulations affecting today's construction industry. • Investigate and report on the process for securing a building permit for a selected location in the community. • Explain what a building code is and where to find published local building codes. • Write persuasively to defend why a particular building code is necessary.	
Safety		Understand and apply practices and procedures required to maintain jobsite safety. Recognize and employ universal construction signs and symbols to function safely in the workplace.	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 the OSHA in job-site safety; (D) explain fall protection, ladder safety,	Identify basic jobsite safety hazards. Demonstrate use of basic Personal Protective Equipment (PPE) and when specific PPE is required. Understand basic workplace injuries and how to communicate the injury to others in an emergency. Demonstrate safe handling of materials and equipment. Demonstrate safe use of fire extinguishers. Demonstrate safe use of various step and extension ladders and proper safety precautions when working at	

			stair safety, and scaffold safety procedures; (E) demonstrate the use and care of appropriate personal protective equipment, including safety goggles and glasses, hard hats, gloves, safety harnesses, and safety shoes; (F) define safe work procedures around electrical hazards; and (G) explain the importance of Safety Data Sheets (SDS).	elevations of greater than 6 feet. Demonstrate ability to communicate workplace hazards.	
Construction Math		Compute and apply mathematical constructs.	The student understands basic construction mathematics. The student is expected to: (A) add, subtract, multiply, and divide whole numbers with and without a calculator; (B) add, subtract, multiply, and divide fractions; (C) add, subtract, multiply, and divide decimals with and without a calculator;	Use physical measurement devices typically employed in construction to complete accurate field measurements. • Determine the appropriate units and record accurate measurements of lengths and angles. Tools should include, but are not limited to: fractional rule, metric rule, measuring tape, architect's scale, engineer's scale, dial caliper, micrometer,	SkillsUSA-Applied Mathematics Contest

			(D) convert decimals to percentages and percentages to decimals; (E) convert fractions to decimals and decimals to fractions; and (F) demonstrate understanding of square foot and lineal foot measurements. The student demonstrates basic measuring practices. The student is expected to: (A) use a standard ruler, a metric ruler, a measuring tape, and an architectural/engineering scale to measure; (B) explain what the metric system is and how it is important in the construction trade; (C) recognize and use metric units of length, weight, volume, and temperature; and (D) recognize some of the basic shapes used in the construction industry and apply basic geometric principles to measure them.	protractor, and square. Performing conversions between fractions, decimals, and percent. For example, convert a decimal to a fraction to prepare a unit for measurement on a fractional scale to the precision of 1/16 of an inch. Accurately calculate area, perimeter, and volume of materials and supplies needed to complete a specific job and create an estimate. Calculate the division of materials on a jobsite to determine materials necessary for a given task and minimize waste/scrap.	

Blueprint Reading		Read, interpret and use technical drawings, documents and specifications to plan a project. Employ appropriate representational media to communicate concepts and design.	The student develops the basics of construction drawing. The student is expected to: (A) interpret and use drawing dimensions; (B) recognize and identify basic construction terms; (C) recognize and identify basic drawing components; (D) recognize and identify commonly used drawing symbols; (E) relate information on construction drawings to actual locations on the print; and (F) recognize different classifications of construction drawings.	Demonstrate knowledge of and ability to navigate a standard set of construction documents Demonstrate ability to read and interpret various print views. Demonstrate ability to interpret the following elements of construction documents: • Dimension lines • Symbols • Notes • Schedules • Elevations • Scale	
Hand and Power Tool		Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.	The student acquires knowledge about care and identification of hand tools. The student is expected to: (A) recognize and identify the basic hand tools and their purposes for the construction trades; (B) inspect basic hand tools visually to	Use tools, machinery and equipment according to industry standards. Properly maintain tools, machines and equipment in a safe manner. Demonstrate safe use and storage of the following hand tools: • Tape measures and other measuring tools • Hammers	

			determine if they are safe for use; and (C) use the basic construction hand tools safely and properly. The student acquires knowledge about care and identification of powered hand tools. The student is expected to: (A) identify powered hand tools commonly used in the construction trades; (B) practice safe and proper application of powered hand tools commonly used in the construction trades; and (C) explain how to properly maintain and clean powered hand tools commonly used in construction trades	• Prybars • Levels • Chalk line • Speed square • Various plyers • Various Wrenches • Utility knife • Screwdrivers • Clamps • Extension cords Demonstrate safe use and storage of the following hand tools: • Miter saw • Corded and cordless drill and impact drivers • Circular saw • Jigsaw • Reciprocating saw • Grinding and sanding devices Knowledge of various blades, drill bits, and driver bits	
Jobsite Communication and Terminology		Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues. Use vocabulary, symbols and formulas commonly	Employ proper use of common industry associated documents. The student interprets and presents information used in workplace situations. The student is expected to:	Demonstrate ability to communicate effectively in the workplace and basic problem-solving skills Demonstrate the ability to work independently and within a team by successfully completing a group assignment.	SkillsUSA Workplace Professional Skills

		used in design and construction. Utilize the ability to locate, organize, analyze, apply and communicate information from multiple sources and perspectives.	(A) interpret information and instructions presented in written form; (B) interpret information and instructions presented in verbal form; (C) communicate effectively using verbal and writing skills; and (D) communicate effectively on the job using electronic communication devices.	Demonstrate basic computer literacy (email and online navigation) to communicate project status. Demonstrate standard employer-employee communication practices and protocols pertaining to the daily work-environment. (keeping time records, updating schedule documents, participating in toolbox talks, etc.) Demonstrate understanding of professional practice (i.e. proper work attire, appropriate language and interpersonal interactions and relationships, and value of inclusivity and diversity in the workplace) Demonstrate understanding of common jobsite terms and apply in appropriate context. Explain the use of a job schedule. Identify common industry forms and explain their use. Research basic regulations affecting today's construction industry.	

				Investigate and report on the process for securing a building permit for a selected location in the community. • Explain what a building code is and where to find published local building codes. • Write persuasively to defend why a particular building code is necessary.	
Basic Materials and Building systems		Compare and contrast the building systems and components for a given project. Demonstrate the construction crafts required for each phase of a given project. Compare and contrast the properties and uses of basic construction materials employed in building construction processes, such as aggregates, asphalt, concrete, steel, wood, and masonry materials.	Select tools, machinery, equipment and supplies that match project requirements. Use appropriate combinations of building materials and components that satisfy the requirements of building construction requirements.	Demonstrate knowledge of basic constructions materials and their applications to various trades (Electrical, Plumbing, Masonry, Carpentry, Insulation, Finish, etc.): • Dimensional lumber • Standard Goods Sheet • Engineered lumber • Light gauge metal framing material • Concrete • Various screws and fasteners Identify tools and processes to plumb, level, and square materials. Distinguish between the various types of fasteners commonly used in	

				construction, such as nails, screws, and bolts, by creating a visual display outlining the properties and uses of each type. Demonstrate the ability to accurately select and install the appropriate fastener in a variety of situations.	