

Colorado CTE Course – Scope and Sequence

| Course Name | Structure Design and Fabrication | | Course Details | Level III course in the Power, Structure & Technology pathway. This is the first course in the Structural systems strand. | | |
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| | | | Course = 0.50 Carnegie Unit Credit | | | |
| Course Description | Students will gain knowledge and skills needed to enter the workforce or to prepare for a postsecondary degree in construction management, architecture, or engineering. Students will acquire knowledge and skills in safety, reading/creating construction drawings, tool ID and usage, building material ID and usage, building codes, and framing. | | | | | |
| 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 # | 18401 | Schedule calculation based on 60 % of instructional time in 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 % of Instructional Time | CTE or Academic Standard Alignment | Competency / Performance Indicator | Outcome / Measurement | CTSO Integration | |
| Lab and workplace safety Review of lab safety & expansion of workplace safety expectations. | 2 | PST.01. Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems. | PST.01.02. Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situations. | PST.01.02.02.c. Devise and document processes to safely implement and evaluate the safe use of AFNR related tools, machinery and equipment. PST.01.02.03.c. Conduct a safety inspection of tools, machines and equipment used in different AFNR related mechanical systems. | | |
| Construction careers & understanding certifications entry level training necessary, postsecondary opportunities, job opportunities | 2 | | | | | |
| Building design, blueprints, reading prints, | 3 | PST.04. Plan, build and maintain AFNR structures. | PST.04.01. Create sketches and plans for AFNR structures. | PST.04.01.01.a. Interpret and explain the meaning of symbols | | |

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| | | | | <p>used in sketches of agricultural structures.</p> <p>PST.04.01.01.b. Apply scale measurement and dimension to develop sketches of agricultural structures.</p> <p>PST.04.01.02.a. Read and interpret the parts and/or views of plans for agricultural structures.</p> | |
| Tool Id & usage and safe operation | 2 | PST.01. CCTC Standard: Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems. | PST.01.02. Performance Indicator: Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situations. | <p>PST.01.02.02.a. Identify the tools, machines and equipment needed to construct and/or fabricate a project in AFNR.</p> <p>PST.01.02.03.b. Select, maintain and demonstrate the proper use of tools, machines and equipment used in different AFNR related mechanical systems.</p> | |
| Building materials, identification and applications | 3 | PST.04. Plan, build and maintain AFNR structures. | PST.04.02. Determine structural requirements, specifications and estimate costs for AFNR structures | <p>PST.04.02.01.a. Summarize and categorize the information needed to complete a bill of materials and cost estimate for an AFNR structure.</p> <p>PST.04.02.01.b. Analyze a project plan to prepare a bill of materials and an estimate of material costs.</p> <p>PST.04.02.01.c. Create a project cost estimate, including materials, labor and management for an AFNR structure.</p> <p>PST.04.02.02.a. Research and summarize sources of industry construction and materials standards and their importance (e.g., American National Standards</p> | |

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| | | | | Institute, ANSI, Underwriters' Laboratories, UL, etc.). PST.04.02.02.b. Assess and analyze local building code requirements for agriculture structures. | |
| Understand and identifying building components, building shapes, roof design Commercial / agriculture, residential, | 4 | PST.04. Plan, build and maintain AFNR structures. | PST.04.03. Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.). | PST.04.03.03.a. Compare and contrast the characteristics of wood and/or metal products used in AFNR structures. | |
| Site preparation, surveying sites, cut / fill, site soil characteristics. Layout of foundation or building | 3 | PST.04. Plan, build and maintain AFNR structures. | PST.04.03. Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.). | PST.04.03.02.a. Summarize the characteristics needed for an ideal building site. PST.04.03.02.b. Complete a building site analysis checklist to select an ideal building site. PST.04.03.02.c. Assess site characteristics, identify adjustments, and demonstrate procedures for preparing a building site. | |
| Foundations, concrete & masonry Foundation design, construction requirements for locations concrete ingredients, concrete mixes, pouring, forming, finishing, calculating amounts, curing processes | 5 | PST.04. Plan, build and maintain AFNR structures. | PST.04.03. Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.). | PST.04.03.06.a. Summarize the characteristics of the components found in concrete. PST.04.03.06.b. Calculate volume for concrete projects. PST.04.03.06.c. Construct, maintain and/or repair AFNR structures with concrete, brick, stone or masonry. | |

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| <p>Measurement & layout Wall construction, setting posts & alignment OC measurements, etc</p> | <p>2</p> | <p>PST.04. : Plan, build and maintain AFNR structures.</p> | <p>PST.04.01. Create sketches and plans for AFNR structures.</p> <p>PST.04.03. Performance Indicator: Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.).</p> | <p>PST.04.01.01.b. Apply scale measurement and dimension to develop sketches of agricultural structures.</p> <p>PST.04.03.03.c. Construct AFNR structures using wood and/or metal materials.</p> | |
| <p>Fasteners, hardware & component construction (truss)</p> | <p>2</p> | <p>PST.04. CTC Standard: Plan, build and maintain AFNR structures.</p> | <p>PST.04.03. Performance Indicator: Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.).</p> | <p>PST.04.03.01.a. Examine the criteria in selecting materials for constructing, maintaining, and/or repairing AFNR structures.</p> <p>PST.04.03.01.b. Analyze and assess samples of materials or products for quality and efficiency of workmanship.</p> <p>PST.04.03.01.c. Select materials for a project based upon an analysis of the project and the quality of the materials.</p> | |
| <p>Building processes Framing Sheathing Setting trusses Roofing</p> | <p>30</p> | <p>PST.04. Plan, build and maintain AFNR structures.</p> | <p>PST.04.03. Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.).</p> | <p>PST.04.03.01.c. Select materials for a project based upon an analysis of the project and the quality of the materials.</p> <p>PST.04.03.03.c. Construct AFNR structures using wood and/or metal materials.</p> | |