

## Colorado CTE Course – Scope and Sequence

<b>Course Name</b>	<b>Building Materials</b>		<b>Course Details</b>	<b>Credit= 0.5</b>  <b>Prerequisite: Construction Technology or Principles of Construction</b>  <b>CTE Credential; CTE Architecture and Construction</b>	
			Course = 0.50 Carnegie Unit Credit		
<b>Course Description</b>	Introduces the student to the scope of the construction industry. Examines the qualities, uses and characteristics of wood, ordering, pricing, fasteners, adhesives, manufactured wood products, steel, vinyl and aluminum and their applications in the construction process. Explores Built-Green products and their characteristics. This course explores inspection, estimation, and appraisal professions.				
<b>Note:</b>	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 #		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 <a href="https://www.cde.state.co.us/standardsandinstruction/essentialskills">https://www.cde.state.co.us/standardsandinstruction/essentialskills</a>					
Instructional Unit Topic	Suggested Length of Instruction	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration
<b>Construction Materials Overview</b>		<p>Understand the physical properties of materials and how they are used in the construction industry.</p> <p>Understand the regulatory environment that controls materials and their application standards in the construction industry.</p>	<p>Understand materials used in the construction process. Student is expected to:</p> <ul style="list-style-type: none"> <li>A) recognize quality control procedures for various materials;</li> <li>B) recognize material manufacturing processes;</li> <li>C) understand the physical limitations of the materials;</li> <li>D) understand how the materials are used in construction;</li> </ul>	<p>Research ASTM International standards. Report on the materials that are included on the ASTM construction standards. Discuss why these standards are important for the construction industry.</p>	

			<ul style="list-style-type: none"> <li>E) understand measurements and units of each material;</li> <li>F) identify sources for additional information about materials when needed;</li> <li>G) understand the regulatory environment under which materials are manufactured and incorporated into new structures; and</li> <li>H) discuss environmental considerations and the sustainability of resources and building materials.</li> </ul>		
<b>Concrete</b>		<p>Understand the material properties of concrete and how it is used in the construction industry.</p> <p>Understand units of measurement for concrete materials.</p>	<p>Student is expected to:</p> <ul style="list-style-type: none"> <li>A) understand basic composition of concrete;</li> <li>B) understand how concrete is used in construction processes including:               <ol style="list-style-type: none"> <li>1. Precast Concrete</li> <li>2. Composite Precast Concrete</li> <li>3. Sitecast Concrete</li> <li>4. Slabs</li> <li>5. Walls</li> <li>6. Columns</li> </ol> </li> <li>C) understand units of measurement</li> <li>D) recognize manufacturing brands;</li> <li>E) identify special applications or installation considerations.</li> </ul>	<p>Compare and contrast One-Way Floor and Roof Framing Systems with Two-Way Floor and Roof Framing Systems.</p>	
<b>Brick and CMU</b>		<p>Understand the material properties of brick and concrete masonry units (CMU) and how they are</p>	<p>Student is expected to:</p> <ul style="list-style-type: none"> <li>A) understand basic composition of mortar, brick and CMUs;</li> </ul>		

		<p>used in the construction industry.</p> <p>Understand units of measurement for brick and CMU materials.</p>	<p>B) understand how the material is used in construction processes including brick masonry and masonry wall construction;</p> <p>C) understand units of measurement</p> <p>D) recognize manufacturing brands;</p> <p>E) identify special applications or installation considerations.</p>		
<b>Masonry and Stone</b>		<p>Identify common masonry and stone material and their applications in the construction industry.</p> <p>Understand units of measurement for masonry and Stone materials.</p>	<p>Student is expected to:</p> <p>A) identify basic masonry and stone materials;</p> <p>B) understand how masonry and stone material is used in construction processes including:</p> <ol style="list-style-type: none"> <li>1. Masonry Wall Types</li> <li>2. Masonry paving</li> <li>3. Stone masonry</li> <li>4. Concrete Masonry</li> </ol> <p>C) understand units of measurement;</p> <p>D) recognize manufacturing brands;</p> <p>E) identify special applications or installation considerations.</p>		
<b>Ferrous and Nonferrous Metals</b>		<p>Identify common ferrous and nonferrous metal materials and their applications in the construction industry.</p>	<p>Student is expected to:</p> <p>A) understand differences among ferrous and nonferrous materials;</p> <p>B) understand how the ferrous and nonferrous material is used in construction processes;</p>	<p>Non-ferrous metals: aluminum, copper, zinc, lead, nickel</p> <p>Ferrous metals: Iron, cast-iron, Steel</p> <p>Manufacturer of Steel, types of steel, heat</p>	

		Understand units of measurement for metal construction materials.	<ul style="list-style-type: none"> <li>C) understand units of measurement;</li> <li>D) recognize manufacturing brands; and</li> <li>E) identify special applications or installation considerations.</li> </ul>	<p>treatment to steel, hot and cold rolled sheets, stainless steel, important failures in steels.</p> <p>Steel Framing Light Gauge Steel</p>	
<b>Wood and Lumber</b>		<p>Identify wood and lumber materials and their applications in the construction industry.</p> <p>Understand units of measurement for wood and lumber materials.</p>	<p>Student is expected to:</p> <ul style="list-style-type: none"> <li>A) understand basic classifications of wood and lumber products;</li> <li>B) understand how the wood materials are used in construction processes including: <ul style="list-style-type: none"> <li>1. Lumber and Wood</li> <li>2. Wood panel products</li> <li>3. Wood Chemical Treatments</li> <li>4. Wood Fasteners</li> <li>5. Wood Product adhesives and formaldehyde</li> </ul> </li> <li>C) recognize common units of measurement; and</li> <li>D) identify special applications or installation considerations.</li> </ul>	<p>Structure of the tree General characteristics Wood types Seasoning of wood Preservation of wood Lamination of wood</p>	
<b>Manufactured Wood Products</b>		<p>Identify common manufactured wood products and their applications in the construction industry.</p> <p>Understand units of measurement for manufactured wood construction materials.</p>	<p>Student is expected to:</p> <ul style="list-style-type: none"> <li>A) understand basic composition of manufactured wood products;</li> <li>B) understand how manufactured wood products are used in construction processes;</li> <li>C) understand units of measurement</li> </ul>	<p>Plastic lumber</p>	

			<p>D) recognize manufacturing brands; and</p> <p>E) identify special applications or installation considerations.</p>		
<b>Common Finishing Materials</b>		<p>Identify common interior and exterior finishing materials in the construction industry.</p> <p>Understand grades and brands for common construction finishing materials.</p>	<p>Student is expected to:</p> <p>A) understand basic composition of commonly used finishing materials and products including</p> <ol style="list-style-type: none"> <li>1. Paint (Exterior and Interior)</li> <li>2. Flooring</li> <li>3. Millwork and Finish Carpentry;</li> </ol> <p>B) understand how finishing materials are selected or used in construction processes;</p> <p>C) recognize manufacturing brands; and</p> <p>D) identify special applications or installation considerations.</p>	<p>Paints: Objectives, composition, types, consideration in choosing a particular paint.</p> <p>Varnish- objectives and applications</p> <p>Plaster of Paris Rubber/Cork</p> <p>Flooring finishes- carpet, tile, hardwood</p> <p>Common kitchen countertop finishes</p> <p>Asbestos considerations for materials</p>	
<b>Siding</b>		<p>Identify and understand the composition of siding materials used in the construction industry.</p>	<p>Student is expected to:</p> <p>A) understand basic composition of commonly used siding materials and products including</p> <ol style="list-style-type: none"> <li>1. Wood</li> <li>2. Composite</li> <li>3. Vinyl</li> <li>4. Metal;</li> </ol> <p>B) understand how finishing materials are selected or used in construction processes;</p>		

			<ul style="list-style-type: none"> <li>C) recognize manufacturing brands; and</li> <li>D) identify special applications or installation considerations.</li> </ul>		
<b>Waterproofing, Roofing, and Insulation</b>		Identify waterproofing, roofing, and insulation materials and their applications in the construction industry.	<p>Understand basic types of waterproofing, roofing, and insulation materials. Student is expected to:</p> <ul style="list-style-type: none"> <li>A) understand how these materials are used in construction processes;</li> <li>B) recognize manufacturing brands; and</li> <li>C) identify special applications or installation considerations.</li> </ul>	Mode of heat transfer in buildings, thermal conductivity and diffusivity of building materials, Values of insulation and types, acoustic insulation, properties of good sound proof materials, noise reduction coefficients of building materials.	
<b>Framing Construction Types</b>		Understand construction framing from the craft professional and real estate professional perspective.	<p>Understand basic types and styles of framing construction. Student is expected to:</p> <ul style="list-style-type: none"> <li>A) explain balloon and platform framing techniques;</li> <li>B) identify common framing construction styles, including: Heavy Timber Construction Materials; Wood Light Frame; and Wood-Concrete; and</li> <li>C) identify fire considerations/classifications for framing construction types.</li> </ul>	<p>Explain the common construction framing styles used to describe real estate. Describe how these various types differ in terms of fire prevention considerations.</p> <p>Explain the advantages and disadvantages of balloon and platform framing.</p>	
<b>Green Building Materials</b>			Understand how the construction industry is increasing sustainability and investigate green building materials. Student is expected to:		

