

## Colorado CTE Course – Scope and Sequence

Course Name	Metal Fabrication		Course Details	Level IV course in the Power, Structure & Technology pathway. This is the second course in the metal fabrication strand.		
			Course = 0.50 Carnegie Unit Credit			
<b>Course Description</b>						
<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.				
<b>SCED Identification #</b>	<b>18404</b>	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 <a href="https://www.cde.state.co.us/standardsandinstruction/essentialskills">https://www.cde.state.co.us/standardsandinstruction/essentialskills</a>						
Instructional Unit Topic	Suggested % of Instructional Time	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration	
<b>Lab and workplace safety Review of lab safety &amp; expansion of workplace safety expectations.</b>	2	<b>NGSS: HS-PS3-1</b> <b>NGSS: HS-PS3-3</b>  <b>PST.01.</b> Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.	<b>PST.01.02.</b> Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situations.	<b>PST 01.02.02.c:</b> Devise and document processes to safely implement and evaluate the safe use of AFNR related tools, machinery and equipment.		
<b>Welding careers &amp; understanding welder qualification testing. Entry-level training necessary, postsecondary opportunities, welding vs. welding fabrication. More in Depth than Adv. Welding</b>	2	<b>CS.05.</b> Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food and Natural Resources Career Pathways.	<b>CRP.10.01.</b> Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.	<b>CRP.10.01.02.a.</b> Examine career clusters and identify potential career opportunities based on personal interests, talents, goals and preferences.		
<b>Mathematical applications in welding Measuring &amp; numeric understanding:</b>	2	<b>PST.01.</b> Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power,	<b>PST.01.02.</b> Apply physical science and engineering principles to design, implement and improve safe and efficient	<b>PST.01.02.01.b</b> Perform mathematical calculations to determine the mechanical advantage of simple machines		

<ul style="list-style-type: none"> <li>• Tape Measure Reading Review</li> <li>• Basic right angle trigonometry             <ul style="list-style-type: none"> <li>• Length of side</li> <li>• Angle of fitting</li> </ul> </li> </ul>		structural and technical systems.	mechanical systems in AFNR situations.	in AFNR related mechanical systems.	
<b>Testing &amp; evaluation - Application of skill throughout the project:</b> <ul style="list-style-type: none"> <li>• Visual examination/inspection of welded assemblies. Locating weld discontinuities</li> <li>• Selection of repair method</li> <li>• Repairing weld discontinuities</li> <li>• Post evaluation</li> </ul>	1	<b>PST.01.</b> Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.	<b>PST.01.03.</b> Apply physical science principles to metal fabrication using a variety of welding and cutting processes (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.).	<b>PST.01.03.01.c.</b> Evaluate the quality of metal fabrication procedures (e.g., SMAW, GMAW, GTAW, fuel-oxygen, and plasma arc torch, etc.)	
<b>Creating or reading blueprints &amp; welding symbols based on project concept:</b> <ul style="list-style-type: none"> <li>• Choose project</li> <li>• Create or use existing blueprint</li> <li>• Decipher welding symbols</li> </ul>	3	<b>PSTS .04</b> Demonstrate skills in project completion on individual and group projects	<b>PSTS.04.01</b> Utilize blueprints in completing an agricultural mechanics project	<b>PSTS.04.01.a</b> Student will identify blueprints, their components and describe their purpose  <b>PSTS.04.01.b</b> Read blueprints with accuracy	
<b>Selection of project factors:</b> <ul style="list-style-type: none"> <li>• Base metal style, size and thickness for project design.</li> <li>• Welding process, filler metal, shielding gas (if necessary)</li> <li>• Joint configuration for project design</li> <li>• Metal processing equipment</li> <li>• Cleaning - pre assembly</li> <li>• Grinding/Finishing method - post assembly</li> </ul>	3	<b>PST.01.</b> Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.	<b>PST.01.03.</b> Apply physical science principles to metal fabrication using a variety of welding and cutting processes (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.).	<b>PST.01.03.02.b.</b> Assess and select the proper electrode for use in various shielded metal arc welding situations.  <b>PST.01.03.01.a.</b> Compare and contrast the principles and procedures of different welding and cutting processes (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.).	

<p><b>Project design &amp; construction</b></p> <ul style="list-style-type: none"> <li>• Bill of materials</li> <li>• Construction steps</li> <li>• Welding joint skill development             <ul style="list-style-type: none"> <li>• Technique</li> <li>• Machine settings for like material thickness and joint design</li> </ul> </li> <li>• Use of different equipment: drill press, hydraulic shear, cold cut saw, chop saw, metal band saw, plasma cutter, welding equipment</li> <li>• Surface preparation and finish</li> <li>• Complete project</li> <li>• Visual Examination - Post Weld</li> </ul>	50	<p><b>PST.01.</b> Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.</p>	<p><b>PST.01.03.</b> Apply physical science principles to metal fabrication using a variety of welding and cutting processes (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.).</p>	<p><b>PST.01.03.01.b.</b> Analyze the situation and determine the best welding and cutting process to be used in metal fabrication.</p> <p><b>PST.01.03.02.c.</b> Construct and/or repair metal structures and equipment using metal fabrication procedures.</p>	
<p><b>Supplemental Content</b> <b>Plasma operation &amp; maintenance</b></p>					