

Colorado CTE Course – Scope and Sequence

Course Name	Engine & Equipment Technology C		Course Details	Level IV course in the Power, Structure & Technology pathway. This is the third semester of content in the Engine / Equipment Technician strand	
			Course = 0.50 Carnegie Unit Credit		
Course Description					
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 #	18402	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
Hydraulic Systems					
Theory of hydraulic operation - thermodynamic laws	2	<p>PSTS .08 Understand and operate power and mechanical systems for agriculture use</p> <p>PST.03. Service and repair AFNR mechanical equipment and power systems.</p>	<p>PSTS .08.04 Apply theory & operation of hydraulic systems</p> <p>PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).</p>	<p>PSTS.08.04.a Understand the theory and principle of operation of hydraulic systems</p> <p>PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.</p>	
Hydraulic vocabulary & terms	1	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic,	PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.	

			transmission, steering, suspension, etc.).		
Understand basic hydraulic system components & function Pumps, cylinders, flow controls, connectors, hoses, piping,	3	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).	PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.	
Hydraulic schematics	2	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).	PST.03.03.01.b. Analyze and interpret hydraulic and pneumatic system symbols and diagrams used in AFNR power, structural and technical systems.	
Differentiate between open and closed systems	2	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).	PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.	
Application of hydraulic systems	2	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).	PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.	

<p>Principles of hydrostatic systems</p>	<p>3</p>	<p>PST.03. Service and repair AFNR mechanical equipment and power systems.</p>	<p>PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).</p>	<p>PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.</p>	
<p>Application of hydrostatic systems</p>	<p>3</p>	<p>PST.03. Service and repair AFNR mechanical equipment and power systems.</p>	<p>PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).</p>	<p>PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.</p>	
<p>Understanding difference between fixed, variable positive and non positive pumps Identification hy pumps</p>	<p>3</p>	<p>PST.03. Service and repair AFNR mechanical equipment and power systems.</p>	<p>PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).</p>	<p>PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.</p>	
<p>Swash plate control</p>	<p>1</p>	<p>PST.03. Service and repair AFNR mechanical equipment and power systems.</p>	<p>PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.)</p>	<p>PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.</p>	

Flow, directional & pressure control valves	1	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).	PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.	
Hydraulic motors application & design	2	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).	PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.	
Hydraulic calculations	3	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.03. Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).	PST.03.03.01.a. Research and summarize the applications of common types of hydraulic and pneumatic systems used in AFNR power, structural and technical systems.	
Electrical Systems					
Ohms Law	3	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.02. Service electrical systems and components of mechanical equipment and power systems using a variety of troubleshooting and/or diagnostic methods.	PST.03.02.01.a Compare and contrast basic units of electricity (e.g., volts, amps, watts, and ohms) and the principles that describe their relationship (e.g., Ohm's Law, Power Law, etc.).	
DC current circuits	2	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.02. Service electrical systems and components of mechanical equipment and power systems using a	PST.03.02.01.c. Analyze and design electrical circuits for AFNR power, structural and technical systems using knowledge of the basic units of electricity.	

			variety of troubleshooting and/or diagnostic methods.		
Electrical schematics / diagrams	3	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.02. Service electrical systems and components of mechanical equipment and power systems using a variety of troubleshooting and/or diagnostic methods.	PST.03.02.02.b. Analyze and interpret electrical system symbols and diagrams.	
Electrical components	3	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.02. Service electrical systems and components of mechanical equipment and power systems using a variety of troubleshooting and/or diagnostic methods.	PST.03.02.02.a. Compare and contrast the characteristics of electronic components used in AFNR power, structural and technical systems (e.g., battery, resistor, diode, transistor, capacitor, etc.).	
DC electrical systems Starting Accessories, lighting & control Charging	10	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.02. Service electrical systems and components of mechanical equipment and power systems using a variety of troubleshooting and/or diagnostic methods.	PST.03.02.01.c. Analyze and design electrical circuits for AFNR power, structural and technical systems using knowledge of the basic units of electricity.	
Controls & sensing devices	3	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.02. Service electrical systems and components of mechanical equipment and power systems using a variety of troubleshooting and/or diagnostic methods.	PST.03.02.03.a. Classify the uses of electrical sensors and controls in AFNR power, structural and technical systems.	
Can-buss systems	1	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.02. Service electrical systems and components of mechanical equipment and power systems using a variety of troubleshooting and/or diagnostic methods.	PST.03.02.01.c. Analyze and design electrical circuits for AFNR power, structural and technical systems using knowledge of the basic units of electricity.	
Electrical troubleshooting	6	PST.03. Service and repair AFNR mechanical equipment and power systems.	PST.03.02. Service electrical systems and components of mechanical equipment and	PST.03.02.01.c. Analyze and design electrical circuits for AFNR power, structural and technical	

			power systems using a variety of troubleshooting and/or diagnostic methods.	systems using knowledge of the basic units of electricity.	