

Colorado CTE Course – Scope and Sequence

Course Name	Diesel Brakes		Course Details	Credit= 0.5 Prerequisite: Diesel Technology II CTE Credential: CTE Transportation		
			Course = 0.50 Carnegie Unit Credit			
Course Description	Focuses on preventive maintenance of heavy duty truck & equipment hydraulic and pneumatic brake systems, including recording of critical information for the customer. Enables students to grasp the importance of preventive maintenance while gaining an understanding of component operation.					
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 #	20107	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	
Safety		Understands industry expectations for safety in the workplace.	Describe safety practices to be followed when performing engine service. Student is expected to: (A) demonstrate use of personal protective equipment; and (B) demonstrate safe use and operation of all tools, and equipment.			
General Brake Fundamentals		Understand terminology and concepts related to diesel brake systems and components.	Understand terminology and concepts related to diesel brake systems and components. Student is expected to:	Research vehicle service information, including fluid type, vehicle service history, service precautions, and technical service bulletins.		

			<ul style="list-style-type: none"> (A) define key braking system terms (B) identify and interpret brake system components including air and hydraulic systems; and (C) identify brake performance problems caused by the mechanical/foundation brake system (air and hydraulic). 		
Diesel Brake Systems		Explain the interaction of diesel brake systems.	<p>Understand the subsystems that affect braking system performance. Student is expected to:</p> <ul style="list-style-type: none"> (A) Understand how technicians diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law); (B) identify and interpret other brake system components including parking brake, power assist, and vehicle dynamic brake systems; (C) identify and inspect electronic brake control systems components. 	<p>Check parking brake operation, and inspect parking brake application and holding devices. Check brake assist/booster system (vacuum or hydraulic) hoses, control valves, and fluid level and condition (if applicable). Check operation of emergency (back-up/reserve) brake assist system. Clean, inspect, lubricate, and/or replace wheel bearings and races/cups, replace seals and wear rings, inspect spindle/tube, inspect and replace retaining hardware, adjust wheel bearings, check hub assembly fluid level and</p>	

				<p>condition, and verify end play with dial indicator method.</p> <p>Identify, inspect, and replace (if needed) unitized/preset hub bearing assemblies.</p>	
Preventative Maintenance		Describe how preventative maintenance for brakes is performed.	<p>Apply knowledge of braking systems and components to routine brake maintenance. Student is expected to:</p> <ul style="list-style-type: none"> (A) evaluate brake systems and components for routine service; (B) explain the removal, cleaning, and inspection of brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware; and (C) apply the process for reassembling, lubricating, and reinstalling caliper, pads, and related hardware; seat pads, and inspect for leaks. 	<p>Check master cylinder fluid level and condition, and determine proper fluid type for application.</p> <p>Inspect hydraulic brake system components for leaks and damage.</p> <p>Check hydraulic brake system operation including pedal travel, pedal effort, and pedal feel.</p> <p>Inspect rotor and mounting surface, and measure rotor thickness, thickness variation, and lateral runout, determine needed action.</p> <p>Inspect and clean disc brake caliper assemblies, inspect and measure disc brake pads, inspect mounting hardware, and determine needed action.</p> <p>Remove brake drum, clean and inspect brake drum and mounting surface, measure brake drum diameter, measure brake lining</p>	

				thickness, inspect brake lining condition, inspect wheel cylinders, and determine needed action.	
Brake Service/Repair			<p>Demonstrate a brake service or repair. Student is expected to:</p> <ul style="list-style-type: none"> (A) identify and interpret brake system concern; determine necessary action. (B) diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary action. (C) apply the process for reassembling, lubricating, and reinstalling caliper, pads, and related hardware; seat pads, and inspect for leaks. (D) explain the removal, cleaning, and inspection of brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware. (E) diagnose electronic brake control systems 		

