LAUSD UNIFIED Division of Adult and Career Education

Career Technical Education (CTE) Course Outline

Course Title:	Auto Tech: Diesel/2
Course Number:	79-90-57
Date:	July 2025
Industry Sector:	Transportation
Pathway:	Systems Diagnostics and Service
CBEDS Title:	Diesel Equipment Mechanics
CBEDS Code:	5657
CalPADS	8531
Credits:	10

Hours:

Total
150

Course Description:

This competency-based course is one in a sequence of three courses designed to meet the Automotive Service Excellence (ASE) Program Certification Standards. It provides students with technical instruction and practical experience with diesel engines incorporating sustainable and green vehicle technologies. Instruction includes an introduction, safety, resource management, trade mathematics, service manuals/computer based info system, tools and equipment, lubrication system, cooling system, air induction and exhaust systems, fuel supply system, electronic fuel management system, engine brakes, preventative maintenance, employability skills and resume preparation, and entrepreneurial skills. The competencies in this course are aligned with the California Common Core Standards and the California Career Technical Education Model Curriculum Standards.

Prerequisites:	Enrollment requires successful completion of the Auto Tech: Diesel/1 (79-90-55) course.
NOTE:	For Perkins purposes this course has been designated as a **concentrator** course. This course **cannot** be repeated once a student receives a Certificate of Completion.
A-G Approval	N/A
Methods of Instruction:	Lecture and discussion, multimedia presentations, visual aids, projects individualized instruction, shop work
Student Evaluation:	Summative: End of section assessments
Industry Certification:	Bureau of Automotive Repair: Brake & Lamp Inspector
Recommended Texts:	Mack, James P. & Daniels, Jason A. Diesel Engine Technology Fundamentals, Service, Repair, 9th Edition, Goodheart-Wilcox, 2020
Link to Resource Folder	https://bit.ly/autotechdiesel2resources

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
A. INTRODUCTION REVIEW Understand, apply, and evaluate classroom and workplace policies and procedures.	1. Review the scope and purpose of the course. 2. Review the classroom policies and procedures. 3. Review and demonstrate Zoom, Schoology, basic computer skills, and practice safe, legal, and responsible use of digital media. 4. Review students' basic knowledge in diesel engines. 5. Review, identify, research, and draw conclusions about different career paths, occupations, employment outlook, and career advancements in the transportation industry sector which impact the automotive industry. 6. Review opportunities available for promoting gender equity and the representation of non-traditional populations in the automotive industry. 7. Review and recognize the importance of ethics, teamwork, respect of individual and cultural differences, and diversity in the workplace. 8. Review the role of the Automotive Service of Excellence (ASE) as it applies to the automotive industry. 9. Review the role of the Automotive Service Education Foundation (ASEF) in auto technician training.	**Career Ready Practice:** 1, 2, 3, 4, 5, 7, 8, 9, 10, 11 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5, 2.6 Career Planning & Management: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.9 Technology: 4.1, 4.2, 4.5 Problem Solving & Critical Thinking: 5.4 Responsibility & Flexibility: 7.2 Ethics & Legal Responsibilities: 8.3, 8.4, 8.5 Leadership & Teamwork: 9.1, 9.6, 9.7 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1, 11.2

(2 hours)		**CTE Pathway:** C5.4
B. SAFETY - GENERAL REVIEW Understand safety procedures and techniques in the auto repair and maintenance sector.	1. Review classroom and workplace first aid, emergency procedures, accidents, and injury prevention. 2. Review the California Occupational Safety and Health Administration (Cal/OSHA) workplace requirements for auto diesel technicians to maintain a safe and healthy working environment. 3. Review the impact of the Environmental Protection Agency (EPA) legislation on the Transportation Industry Sector practices in protecting and preserving the environment. 4. Review and demonstrate ASEF standards regarding proper handling, storage, and disposal of chemicals and materials used in an auto shop. 5. Review the impact of California Air Resources Board (ARB) legislation on the Transportation Industry Sector. 6. Review the Bureau of Automotive Repair (BAR) standards for consumer and environmental protection. 7. Review and practice the use, understand the information, and be responsible for the Safety Data Sheet (SDS) as it applies to the automotive industry. 8. Review the safety items required by federal, state, and local regulations. 9. Review the importance of proper personal hygiene in the classroom and auto shop. 10. Review and demonstrate standards regarding proper use of protective equipment in an auto shop: a. clothing and gloves b. respiratory gear c. eye gear d. work shoes e. ventilation f. proper use of tools and equipment	**Career Ready Practice:** 1, 2, 4, 5, 7, 10, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.1, 5.4 Health & Safety: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7 Responsibility & Flexibility: 7.2, 7.7 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C1.1, C1.2, C1.3, C1.4, C2.2, C2.3, C2.5, C4.2, C5.2

(3 hours)	11. Review proper handling, storage, and disposal of chemicals and hazardous materials used in an auto shop. 12. Practice personal safety when lifting, bending, or moving equipment and supplies. 13. Pass the Safety Test with 100% accuracy.	
C. RESOURCE MANAGEMENT REVIEW Understand, apply, and evaluate the resource management principles and techniques in the auto repair and maintenance field. (1 hour)	1. Review and describe the benefits of the following: a. resources b. management c. sustainability d. profitability e. company growth 2. Review and list specific examples of the effective management of the following resources in the auto shop repair and maintenance business: a. time b. materials c. personnel 3. Pass a Resource Management assessment with an 80% score or higher.	**Career Ready Practice:** 1, 2, 7 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3 Responsibility & Flexibility: 7.1, 7.2, 7.4 Technical Knowledge & Skills: 10.1 **CTE Pathway:** C5.1, C5.3
D. TRADE MATHEMATICS REVIEW Understand, apply, and evaluate the mathematical requirements used in auto diagnosis, maintenance, and the repair field.	1. Review and identify the practical math terminology in auto repair and maintenance. 2. Review, demonstrate, and ask questions regarding problem-solving techniques involving: a. basic trade mathematical operations b. changing fractions to decimals c. changing decimals to fractions d. engineering notation 3. Review, demonstrate, and interpret the English and metric units of the measuring system; draw conclusions to make informed decisions.	**Career Ready Practice:** 1, 2, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3 Problem Solving & Critical Thinking: 5.1, 5.2, 5.4

(2 hours)	4. Review and demonstrate problem-solving techniques: a. using algebra b. using percentages c. using algebra (angles and degrees) d. for reading and interpreting graphs e. when using a calculator 5. Pass a Trade Mathematics assessment with an 80% score or higher.	Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:** C2.2, C2.3, C2.4, C2.5
E. SERVICE MANUALS AND COMPUTER-BASED INFORMATION SYSTEMS REVIEW Understand, apply, and evaluate the contents of service manuals and computer-based information systems as important sources of reference according to manufacturer specifications. (2 hours)	1. Review the different types of service manuals. 2. Review the different types of information that can be found in service manuals, such as specifications, troubleshooting charts, and repair information. 3. Review and demonstrate the use of service manuals. 4. Work in teams to describe and demonstrate the use of web-based search engines to find automotive technical information. 5. Complete a work order to include customer information, vehicle identifying information, customer concerns, related service history, cause, and correction. 6. Complete a Preventative Maintenance Inspection Sheet that includes bumper-to-bumper visual inspection. 7. Pass a Service Manual And Computer-Based Information Systems assessment with an 80% score or higher.	**Career Ready Practice:** 1, 2, 4, 5, 9, 10, 11 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2, 4.4, 4.5 Problem Solving & Critical Thinking: 5.2, 5.3, 5.4 Leadership & Teamwork: 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:** C2.6, C4.3, C4.4

F. TOOLS AND EQUIPMENT REVIEW Understand, apply, and evaluate the policies and procedures for using brake diagnostic, maintenance, and repair tools and equipment. (8 hours)	1. Review, define, discuss, and demonstrate the proper use, maintenance, and storage techniques for the following specialty tools and equipment for diesel engines: a. connector pick tool set b. ball/small hole gauges c. cooling system vacuum fill machine (optional) d. dial bore gauge or telescoping gauges e. engine stands f. fan hub wrenches g. injector removal tool(s) h. liner installer (Universal) i. liner puller (Universal) j. precision straight edge k. protrusion gauge (cylinder liner height) l. ring compressor m. ring expander(s) n. rod bolt protectors o. soft jaw vise or adapters p. valve spring compressor q. vibration damper puller r. fifth wheel test pin s. stopwatch t. tire square u. trailer cord tester v. tachometer w. compression tester x. cylinder leakage tester y. engine vacuum gauge 2. Review and demonstrate the following: a. selection of the appropriate hand, power tools, and equipment by job b. procedures for checking out hand, power tools, and equipment from the tool room c. safe use of the most common hand, power tools and equipment in the auto shop d. practicing personal safety when lifting, bending, or moving equipment and supplies 3. Pass a Tools and Equipment assessment with an 80% score or higher.	**Career Ready Practice:** 1, 2, 4, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Health & Safety: 6.3, 6.4, 6.6 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:** C1.4, C2.1, C2.2, C2.3

G. LUBRICATION SYSTEM Understand, apply, and evaluate the diagnostic, maintenance, and repair techniques for the lubrication system of a diesel engine according to manufacturer specifications (15 hours)	1. Test engine oil pressure and check operation of pressure sensor, gauge, and/or sending unit; test engine oil temperature and check operation of temperature sensor; determine needed action. 2. Demonstrate how to check engine oil level, condition, and consumption; determine needed action. 3. Inspect and measure oil pump, drives, inlet pipes, and pick-up screens; check drive gear clearances; determine needed action. 4. Inspect oil pressure regulator valve(s), by-pass and pressure relief valve(s), oil thermostat, and filters; determine needed action. 5. Inspect, clean, and test oil cooler and components; determine needed action. 6. Inspect turbocharger lubrication and cooling systems; determine needed action. 7. Determine proper lubricant, perform oil, and filter change. 8. Pass a Lubrication System assessment with an 80% score or higher.	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.2, 5.3, 5.4 Demonstration & Application: 11.1 **CTE Pathway:** C1.3, C2.2, C2.3, C3.7
H. COOLING SYSTEM Understand, apply, and evaluate the diagnostic, maintenance, and repair techniques for the cooling system of a diesel engine according to manufacturer specifications.	1. Check engine coolant type, level, condition, and consumption; test coolant for freeze protection and additive package concentration; determine needed action. 2. Demonstrate and test coolant temperature, and check operation of temperature and level sensors, gauge, and/or sending unit; determine needed action. 3. Inspect and reinstall/replace pulleys, tensioners, and drive belts; adjust drive belts and check alignment. 4. Inspect thermostat(s), by-passes, housing(s), and seals; replace as needed. 5. Recover, flush, and refill with recommended coolant/additive package, removing air from cooling system, and dispose of coolant in accordance with SDS.	**Career Ready Practice:** 1, 2, 3, 4, 5, 9, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.3, 5.4 Leadership & Teamwork:

(15 hours)	6. Work in teams to inspect coolant conditioner/filter assembly for leaks, and inspect valves, lines, and fittings; replace as needed. 7. Inspect water pump and hoses; replace as needed. 8. Inspect, clean, and pressure test radiator, pressure cap, tank(s), and recovery systems; determine needed action. 9. Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud; replace as needed. 10. Pass a Cooling System assessment with an 80% score or higher.	9.7 Demonstration & Application: 11.1 **CTE Pathway:** C1.2, C2.2, C2.3, C3.7, C6.2, C7.5
I. AIR INDUCTION AND EXHAUST SYSTEMS Understand, apply, and evaluate the diagnostic, maintenance, and repair techniques for the air induction and exhaust systems (aftertreatment) of a diesel engine according to manufacturer specifications.	1. Perform air intake system restriction and leakage tests; determine needed action. 2. Demonstrate and perform intake manifold pressure (boost) test; determine needed action. 3. Perform exhaust back pressure test; determine needed action. 4. Inspect turbocharger(s), wastegate, and piping systems; determine needed action. 5. Work in teams to inspect and test turbocharger(s), Constant Geometry Turbo (CGT), Variable Geometry Turbo (VGT), and Waste Gated Turbo, pneumatic, hydraulic, electronic controls, and actuators. 6. Check air induction system: piping, hoses, clamps, and mounting; service or replace air filter as needed. 7. Remove and reinstall turbocharger/wastegate assembly. 8. Inspect intake manifold, gaskets, and connections; replace as needed. 9. Inspect, clean, and test charge air cooler assemblies; replace as needed. 10. Inspect exhaust manifold, piping, mufflers, and mounting hardware; repair or replace as needed. 11. Inspect and test preheater/inlet air heater, or glow plug system and controls; perform needed action.	**Career Ready Practice:** 1, 2, 4, 5, 9, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.3, 5.4 Leadership & Teamwork: 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:**

(15 hours)	12. Inspect and test Exhaust Gas Recirculation (EGR) system including EGR valve, cooler, piping, filter, electronic sensors, controls, wiring, Diesel Particulate Filter (DPF), Diesel Exhaust Fluid (DEF) and Selective Catalyst Reduction (SCR); determine needed action. 13. Pass an Air Induction and Exhaust Systems assessment with an 80% score or higher.	C2.2, C2.3, C6.2
J. FUEL SUPPLY SYSTEM Understand, apply, and evaluate the diagnostic, maintenance, and repair techniques for the fuel supply system of a diesel engine according to manufacturer specifications. (15 hours)	1. Demonstrate and check fuel level, and condition; determine needed action. 2. Perform fuel supply and return system tests; use reference and technical service materials to accurately diagnose; determine needed action. 3. Inspect fuel tanks, vents, caps, mounts, valves, screens, crossover system, supply and return lines and fittings; determine needed action. 4. Inspect, clean, and test fuel transfer (lift) pump, pump drives, screens, fuel/water separators/ indicators, filters, heaters, coolers, Electronic Control Module (ECM) cooling plates, and mounting hardware; determine needed action. 5. Work in teams to inspect and test valves, pressure regulator valves, and restrictive fittings; determine needed action. 6. Check fuel system for air; determine needed action. 7. Prime and bleed fuel system. 8. Pass a Fuel Supply System assessment with an 80% score or higher.	**Career Ready Practice:** 1, 2, 4, 5, 9, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Leadership & Teamwork: 9.7 Demonstration & Application: 11.1 **CTE Pathway:** C2.1, C2.3, C4.3, C6.4
K. ELECTRONIC FUEL MANAGEMENT SYSTEM Understand, apply, and evaluate the	1. Inspect and test power and ground circuits and connections; measure and interpret voltage, voltage drop, amperage, and resistance readings using a digital multimeter (DMM); determine needed action.	**Career Ready Practice:** 1, 2, 4, 5 **CTE Anchor:**

diagnostic, maintenance, and repair techniques for the fuel supply system of a diesel engine according to manufacturer specifications (30 hours)	2. Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic diagnostic equipment and tools (to include PC based software and/or data scan tools); determine needed action. 3. Check and record electronic diagnostic codes and trip/operational data; monitor electronic data; clear codes; determine further diagnosis. 4. Locate and use relevant service information (to include diagnostic procedures, flow charts, and wiring diagrams). 5. Inspect and replace electrical connector terminals, seals, and locks. 6. Inspect and test switches, sensors, controls, actuator components, and circuits; adjust or replace as needed. 7. Using recommended electronic diagnostic tools (to include PC based software and/or data scan tools), access and interpret customer programmable parameters. 8. Remove and install Electronic Unit Injectors (EUI) and related components; recalibrate ECM (if applicable). 9. Inspect, test, and adjust EUI; determine needed action. 10. Perform cylinder cutout test utilizing recommended electronic diagnostic tool. 11. Perform on-engine inspections and tests on hydraulic electronic unit injector high pressure oil supply and control systems; determine needed action. 12. Perform on-engine inspections and tests on common rail type injection systems; determine needed action. 13. Inspect high pressure injection lines, hold downs, fittings, and seals; determine needed action. 14. Pass an Electronic Fuel Management System assessment with an 80% score or higher.	Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.3, 5.4 **CTE Pathway:** C2.2, C2.3, C3.7, C6.4, C7.1, C7.2, C7.3
L. ENGINE BRAKES Understand, apply, and evaluate the	1. Inspect, test, and adjust engine and exhaust brake control circuits, switches, and solenoids; repair or replace as needed; use reference and/or technical service bulletins as needed.	**Career Ready Practice:** 1, 2, 4, 5

diagnostic, maintenance, and repair techniques for the engine brake system of a diesel engine according to manufacturer specifications. (15 hours)	2. Inspect engine and exhaust brake housing, valves, seals, lines, and fittings; repair or replace as needed. 3. Pass an Engine Brakes assessment with an 80% score or higher.	**CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.3 **CTE Pathway:** C2.2, C2.3, C3.7, C4.3, C5.6, C6.3, C7.7
M. PREVENTATIVE MAINTENANCE Understand, apply, and evaluate the preventive maintenance techniques for heavy-duty trucks.	1. Explain the types of maintenance intervals for the various types of truck and heavy equipment. 2. Demonstrate and check an engine compartment for leaks (fuel, air, coolant, and exhaust). 3. Demonstrate and inspect an air intake system (mounts, hoses, clamps, restriction indicators, turbo) for leaks, damage, and restrictions. 4. Listen and note unusual noises. 5. Check optional equipment for proper operation; use reference materials and/or technical service bulletins as needed. 6. Demonstrate and check air conditioning condenser, radiator, and charge air-coolers for airflow restriction. 7. Work in teams to check for and repair fluid leaks; inspect and replace rear axle(s) drive unit cover plates, gaskets, vents, magnetic plugs, and seals. 8. Remove and replace differential carrier assembly. 9. Pass a Preventative Maintenance assessment with an 80% score or higher.	**Career Ready Practice:** 1, 2, 4, 5, 9, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.3, 5.4 Leadership & Teamwork: 9.7 Demonstration & Application: 11.1 **CTE Pathway:**

(20 hours)		C2.2, C2.3, C2.6, C3.7, C4.3, C7.7
N. EMPLOYABILITY SKILLS AND RESUME PREPARATION REVIEW Understand, apply, and evaluate the employability skills and résumé preparation desired of automotive technicians.	1. Review and define employer requirements for soft skills to include: a. attitude toward work b. communication and collaboration c. critical thinking, problem solving, and decision-making d. customer service e. diversity in the workplace f. flexibility and adaptability g. interpersonal skills h. leadership and responsibility i. punctuality and attendance j. quality of work k. respect, cultural and diversity differences l. teamwork m. time management n. trust and ethical behavior o. work ethic 2. Review a career plan that reflects career interests, pathways, and post-secondary options. 3. Review/revise a résumé, cover letter, and/or portfolio. 4. Review and demonstrate, analyze, research, and review the role of online job searching platforms and career websites to make informed decisions. 5. Review the importance of assessing social media account content for professionalism. 6. Review and demonstrate and complete and/or review an on-line job application. 7. Review and demonstrate interview skills to get the job to include a. do's and don'ts for job interviews	**Career Ready Practice:** 1, 2, 3, 4, 5, 7, 8, 9, 10, 11 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.4, 2.5 Career Planning & Management: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.8, 3.9 Technology: 4.1, 4.2, 4.3, 4.5 Problem Solving & Critical Thinking: 5.1, 5.4 Responsibility & Flexibility: 7.2, 7.3, 7.4, 7.7 Ethics & Legal Responsibilities: 8.3, 8.4, 8.5 Leadership & Teamwork: 9.1, 9.2, 9.3, 9.4, 9.6, 9.7 Technical Knowledge & Skills: 10.1, 10.3 Demonstration & Application: 11.1, 11.2, 11.5

(4 hours)	b. how to dress for the job 8. Review and demonstrate and create sample follow-up letters. 9. Review the importance of the continuous upgrading of job skills as it relates to: a. certification, licensure, and/or renewal b. professional organizations/events c. industry associations and/or organized labor	**CTE Pathway:** C5.4, C5.5
O. ENTREPRENEURIAL SKILLS Understand, apply, and evaluate the process involved in becoming an entrepreneur in the automotive industry. (3 hours)	1. Define entrepreneurship. 2. Identify and research the necessary characteristics of successful entrepreneurs. 3. Examine personal goals prior to starting a business. 4. Evaluate sources of monetary investment in a business opportunity. 5. Explain licensing/permit requirements for a business. 6. Explain how the Small Business Administration (SBA) assists entrepreneurs with lenders and funding to help them plan, start and grow a business. 7. Differentiate between sustainable and green business practices. 8. Demonstrate a budget to identify start-up expenses. 9. Pass an entrepreneurial skills assessment with an 80% score or higher.	**Career Ready Practice:** 1, 2, 4, 5, 10, 11, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem solving & Critical Thinking: 5.3, 5.4 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1 **CTE Pathway:** C5.1, C5.3

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