

COURSE OUTLINE**Course:** 71400 ADVANCED AUTOMOTIVE TECHNOLOGY - CVE**Total Course Hours:** 720.00**CBEDS Title:** AUTOMOTIVE MECHANICS**CBEDS #:** 5655**Job Title(s):**

Automotive Technician, Apprentice Technician, Service Writer, Parts Department Assistant

Prerequisites:

Must complete one year of Automotive, Automotive Technology or Auto Quick Serve or Consumer Auto. Only exception would be teacher recommendation or pass the Automotive 1 Test.

Course Description:

This course provides entry-level skill training in suspension and steering, electrical/electronic systems, brakes, and engine performance. Learning areas also include engine tune-up, tires, auto cooling and operation of special electronic testing equipment. Students that complete 2-years of Automotive are eligible to participate in community classroom which means they will be placed with an Automotive Dealership as an intern. Integrated throughout the course are Academic and CTE standards, which include safety, communication, technology, ethics, career planning and other employability skills.

Hours	
Class	OJT

Occupational Competencies

1-7 on the Course Outline are generic to all BVROP courses and include the BVROP Student Outcomes

2.00	2.00	1	<u>ORIENTATION</u>	<ul style="list-style-type: none"> A Identifies and discusses course objectives and competencies. B Discusses ROP Student Outcomes. C Explains class attendance and behavior objectives.
3.00	2.00	2	<u>HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT</u>	<ul style="list-style-type: none"> A Describes accident procedure. B Demonstrates appropriate safety practices (e.g. bending, lifting, etc.). C Demonstrates knowledge of classroom procedures and drills (e.g. earthquake, fire and emergency). D Understands CAL-OSHA requirements for proper and safe use and disposal of hazardous waste
3.00	2.00	3	<u>ETHICS AND LEGAL RESPONSIBILITIES</u>	<ul style="list-style-type: none"> A Defines sexual harassment and discusses tactics for handling harassment situations. B Applies appropriate workplace behavior and standards. C Identifies automotive repair standards D Defines needs of accurate repair orders
2.00	4.00	4	<u>LEADERSHIP AND TEAMWORK</u>	<ul style="list-style-type: none"> A Describes the characteristics and benefits of teamwork and leadership. B Demonstrates ability to make appropriate decisions. C Works well with others and gives/takes constructive criticism.

Hours	
Class	OJT

10.00	10.00	5	<p><u>CAREER PLANNING</u></p> <p>A Prepares a finished, professional portfolio showing the best work that has been completed during the class.</p> <p>B Locates job opportunities through the use of want-ads and placement agencies.</p> <p>C Visits at least one facility related to area of training and observes jobs performed.</p> <p>D Completes a job application correctly.</p> <p>E Prepares for and critiques a simulated employment interview.</p> <p>F Discusses employee benefits and rights as related to the specific occupational job area including gender equity and equal opportunity.</p> <p>G Identifies acceptable procedures to leave a job.</p> <p>H Applies for a scholarship.</p> <p>I Completes a professional resume.</p> <p>J Demonstrates appropriate personal grooming and dress.</p>
3.00	2.00	6	<p><u>COMMUNICATION</u></p> <p>A Uses effective workplace conversation.</p> <p>B Reads and interprets written information and directions.</p> <p>C Practices various forms of written communication appropriate to the occupation.</p>
2.00	3.00	7	<p><u>STUDENT OUTCOMES</u></p> <p>A Demonstrates Occupational Specific, Communication and Critical Thinking Skills</p> <p>B Demonstrates Responsible Work Ethics</p> <p>C Demonstrates Career/Employment Literacy</p> <p>D Demonstrates Effective Use of Technology</p>

Hours	
Class	OJT

50.00	
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8 SUSPENSION AND STEERING - I

- A** Completes work order to include customer information, vehicle identifying information, customer concern, related service history, cause and correction.
- B** Identifies and interprets suspension and steering concern; determines necessary action.
- C** Researches applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions, and technical service bulletins.
- D** Locates and interprets vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals).
- E** Demonstrates SRS (Air Bag) disable and service.
- F** Removes and replaces steering wheel. Center/time supplemental restraint system (SRS) coil (clock spring).
- G** Diagnoses power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, noise and fluid leakage concerns; determines necessary action.
- H** Diagnoses power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, noise and fluid leakage concerns; determines necessary action.
- I** Inspects steering shaft universal-joint(s), flexible coupling (s), collapsible column, lock cylinder mechanism and steering wheel; performs necessary action.
- J** Adjusts manual or power non-rack and pinion worm preload and sector lash.
- K** Removes and replaces manual or power rack and pinion steering gear; inspects mounting bushings and brackets.
- L** Removes and replaces manual or power rack and pinion steering gear; inner tie rod sockets and bellows.
- M** Demonstrates power steering fluid type, level check and condition.
- N** Flushes, fills and bleeds power steering system.
- O** Inspects and replaces power steering fluid leakage; determines action.
- P** Removes, inspects, replaces and adjusts power steering pump belt.
- Q** Removes and reinstalls power steering pump.
- R** Removes and reinstalls power steering pump pulley; checks pulley and belt alignment.
- S** Inspects and replaces power steering hoses and fittings.
- T** Inspects and replaces pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steeringlinkage damper.
- U** Inspects, replaces and adjusts tie rod ends, tie rod sleeves and clamps.
- V** Demonstrates diagnoses, electronically controlled suspension using scan tool.
- W** Inspects and tests non-hydraulic electric power assist steering.
- X** Identifies hybrid vehicle power steering system, electrical circuits, service and safety precautions.
- Y** Demonstrates front suspension diagnosis: LASA Suspension and Strut Suspension, noise, body sway and ride height.

Hours	
Class	OJT

30.00	
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9 SUSPENSION AND STEERING - II

- A** Demonstrates front strut suspension diagnosis: Strut Suspension, noise, body sway and ride height.
- B** Demonstrates lower and upper control arm service.
- C** Demonstrates strut rod bushing removal and replacement.
- D** Demonstrates remove, inspect and/or replace ball joint, upper or lower service.
- E** Demonstrates steering knuckle assembly removal and replacement.
- F** Demonstrates inspect, replace coil spring replacement (L.A.S.A.)
- G** Demonstrates torsion bar suspension service.
- H** Demonstrates stabilizer bar bushing and link removal and replacement.
- I** Removes, inspects and installs strut cartridge, coil spring, insulators or bearing (front).
- J** Demonstrates knowledge of lubrication.
- K** Demonstrates vehicle service diagnostics.
- L** Demonstrates SRS (Air Bag) disable and service.
- M** Removes and replaces steering wheel. Center/time supplemental restraint system (SRS) coil (clock spring).
- N** Demonstrates knowledge of steering column and related mechanism inspection.
- O** Demonstrates power steering and rack and pinion service and diagnosis.
- P** Demonstrates power steering fluid level check and inspection and hoses inspection and replacement.
- Q** Demonstrates power steering pump pressure check and service.
- R** Demonstrates steering component removal and replacement.
- S** Demonstrates rack and pinion tie rod end removal and replacement.
- T** Demonstrates knowledge of variable assist steering systems using scan tool.
- U** Inspects and tests non-hydraulic electric power assist steering.
- V** Identifies hybrid vehicle power steering electrical circuits, service and safety precautions.
- W** Demonstrates front suspension diagnosis: LASA Suspension and Strut Suspension.
- X** Demonstrates lower and upper control arm service.
- Y** Demonstrates strut rod bushing removal and replacement.
- Z** Demonstrates ball joint service: LASA Suspension.

Hours	
Class	OJT

20.00	
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10 SUSPENSION AND STEERING - III

- A** Demonstrates steering knuckle assembly removal and replacement.
- B** Demonstrates coil spring replacement (front).
- C** Demonstrates torsion bar suspension service.
- D** Demonstrates stabilizer bar bushing and link removal and replacement.
- E** Removes, inspects and installs strut cartridge, coil spring, insulators or bearing (front).
- F** Demonstrates ball joint service: Strut suspension
- G** Demonstrates knowledge of lubrication.
- H** Demonstrates coil spring replacement (rear), rear suspension inspection and leaf spring replacement.
- I** Demonstrates inspection and installs transverse link, control arm bushings and mounts (rear).
- J** Removes, inspects and installs leaf spring, silencers, shackles, brackets, bushings & mounts.
- K** Removes, inspects and installs strut cartridge, coil spring, insulators or bearing (rear).
- L** Demonstrates shock absorber replacement.
- M** Removes, inspects and services or replaces front and rear wheel bearings.
- N** Demonstrates diagnose, electronically controlled suspension using scan tool.
- O** Diagnoses vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determines necessary action.
- P** Performs prealignment inspection; performs necessary action.
- Q** Measures vehicle riding height; determines necessary action.
- R** Checks and adjusts front and rear wheel camber; performs necessary action.
- S** Checks and adjusts front and rear wheel caster; performs necessary action.
- T** Checks and adjusts rear wheel toe, center steering wheel.
- U** Checks and adjusts toe out on turns, determines necessary action.
- V** Checks SAI and included angle, determines necessary action.
- W** Checks and adjusts rear wheel toe.
- X** Checks rear wheel thrust angle; determines necessary action.
- Y** Checks for front wheel setback; determines necessary action.
- Z** Checks front cradle (subframe) alignment; determines necessary action.

10.00	
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11 SUSPENSION AND STEERING - IV

- A** Diagnoses tire wear patterns; determines necessary action.
- B** Inspects tires; checks and adjusts air pressure.
- C** Diagnoses wheel/tire vibration, shimmy and noise; determines necessary action.
- D** Rotates tires according to manufacturer's recommendations.
- E** Measures wheel, tire, axle and hub runout; determines necessary action.
- F** Diagnoses tire pull (lead) problem; determines necessary action.
- G** Balances wheel and tire assembly (static and dynamic).
- H** Dismounts, inspects and remounts tire and wheel.
- I** Dismounts, inspects and remounts tire on wheel equipped with tire pressure sensor.
- J** Reinstalls wheel: Torque lug nuts.
- K** Inspects tire and wheel assembly for air loss; performs necessary action.
- L** Repairs tire using internal patch.
- M** Inspects, diagnoses and calibrates tire pressure monitoring system.
- N** Demonstrates proficiency in using oxy-acetylene torch to heat and cut metal.

Hours	
Class	OJT

90.00	12 ELECTRICAL/ELECTRONICS - I
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- A** Completes work order to include customer information, vehicle identifying information, customer concern, related service history, cause and erosion.
- B** Identifies and interprets electrical/electronic system concern; determines necessary action.
- C** Researches applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins.
- D** Locates and interprets vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).
- E** Diagnoses electrical/electronic integrity of series, parallel and series-parallel circuits using principles of electricity (Ohm's Law)
- F** Uses wiring diagrams during diagnoses of electrical circuit problems.
- G** Demonstrates the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems.
- H** Checks electrical circuits with a test light; determines necessary action.
- I** Measures source voltage and performs voltage drop tests in electrical/electronic circuits using a voltmeter, determines necessary action.
- J** Measures current flow in electrical/electronic circuits and components using an ammeter; determines necessary action.
- K** Checks continuity and measure resistance in electrical/electronic circuits and components using an ohmmeter; determines necessary action.
- L** Checks electrical circuits using fused jumper wires; determines necessary action.
- M** Locates shorts, grounds, opens and resistance problems electrical/electronic circuits; determines necessary action.
- N** Measures and diagnoses the cause (s) of excessive key-off battery drain (parasitic draw); determines necessary action.
- O** Knowledge of inspection, testing and repair of fusible links, circuit breakers, fuses: determines needed repair.
- P** Demonstrates inspection and test of connectors, relays, solenoids devices and wires of electrical circuit, performs necessary repairs.
- Q** Demonstrates remove and replace terminal end from connectors.
- R** Demonstrates repair of connectors and terminal ends
- S** Repairs wiring harness (including CAN/BUS systems).
- T** Performs solder repair of electrical wiring.
- U** Identifies location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.
- V** Performs battery state-of-charge test, determines needed action.
- W** Performs battery capacity test (or conductance test); confirms proper battery capacity for vehicle application; determines necessary action.
- X** Demonstrates, maintains or restores electronic memory functions.
- Y** Inspects and cleans battery cables, connectors, clamps & hold downs, repair as needed.
- Z** Knowledge of boost starting and jump starting a vehicle.

Hours	
Class	OJT

100.00	13 ELECTRICAL/ELECTRONIC SYSTEMS II
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- A** Identifies high voltage circuits of electric or hybrid electric vehicle and related safety precautions.
- B** Identifies electronic modules, security systems and/or radios that require reinitialization or code entry following battery disconnect.
- C** Identifies hybrid vehicle auxillary (12v) battery service, repair and test procedures.
- D** Performs starter current draw test, determines necessary action.
- E** Demonstrates ability to test the starter circuit breakers and remove and replace starters.
- F** Demonstrates remove and install starter in vehicle.
- G** Inspects and tests switches, connectors and wires of starter control circuits; performs necessary action.
- H** Differentiates between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.
- I** Performs charging system output test; determines necessary action.
- J** Diagnoses charging system for the cause of undercharge, no-charge, and overcharging conditions.
- K** Inspects, adjusts or replaces generator (alternator) drive belts, pulleys and tensioners; checks pulley and belt alignment.
- L** Demonstrates ability to remove and reinstall alternator.
- M** Performs charging circuit voltage drop tests; determines necessary action.
- N** Demonstrates the cause of brighter than normal, intermittent, dim or no light operation; determines necessary action.
- O** Demonstrates inspection, diagnosis and test turn signal and hazard light circuit operation.
- P** Identifies system voltage and safety precautions associated with high intensity discharge headlights.
- Q** Inspects and tests sensors, connectors and wires of electronic (digital) instruments circuits; determines necessary action.
- R** Demonstrates inspect & test gauges and sending units for cause of intermittent, high, low or no gauge readings; determines necessary action.
- S** Demonstrates ability to inspect and test connectors, wires and printed circuit boards of gauge circuits.
- T** Diagnoses the cause of incorrect operation of warning devices and other driver information systems; determines necessary action.
- U** Inspects and tests sensors, connectors and wires of electronic (digital) instruments circuits; determines necessary action.
- V** Demonstrates ability to diagnose problems in the horn system.
- W** Diagnoses incorrect wiper operation; diagnoses wiper control and park problems; performs necessary action.
- X** Diagnoses incorrect washer operation; performs necessary action.

35.00	14 ELECTRICAL/ELECTRONIC SYSTEMS III
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- A** Demonstrates diagnosis of incorrect operation of motor-driven accessory circuits; determines necessary action.
- B** Demonstrates ability to diagnose incorrect operation of heated glass, mirror or seat operation; determines necessary action.
- C** Demonstrates ability to diagnose incorrect operation of electric door lock; determines necessary action.
- D** Demonstrates ability to diagnose incorrect operation of cruise control system.
- E** Demonstrates ability to diagnose supplemental restraint system (SRS) concerns; determines necessary action.
- F** Demonstrates ability to disarm and arm bag system.
- G** Demonstrates ability to diagnose problems in radio.
- H** Demonstrates ability to remove and reinstall door panel.
- I** Demonstrates ability to check for module communication errors using scan tool.
- J** Demonstrates ability to diagnose cause of false, intermittent or no operation of anti-theft system.

Hours	
Class	OJT

50.00	15 BRAKES I
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- A** Completes work order to include customer information, vehicle identifying information, customer concern, related service history, cause and correction.
- B** Identifies and interprets electrical/electronic system concerns; determines necessary action.
- C** Researches applicable vehicle and service information such as electrical/electronic system operation, vehicle service history, service precautions and technical service bulletins.
- D** Locates and interprets vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).
- E** Diagnoses pressure concerns in the brake system using hydraulic principles (Pascal's Law).
- F** Measures brake pedal height; determines necessary action.
- G** Demonstrates inspection of master cylinder for internal and external leaks and proper operation; determines needed repairs.
- H** Removes, bench bleeds, and reinstalls master cylinder.
- I** Inspects brake lines, flexible hoses and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and support; determines necessary action.
- J** Demonstrates, fabricates and/or installs brake lines (flare): replaces hoses, fittings, and supports.
- K** Selects, handles, stores and fills brake fluids to proper level.
- L** Inspects, tests and/or replaces metering (hold-off), proportioning (balance), pressure differential and combination valves.
- M** Inspects, tests and adjusts height (load) sensing proportioning valve.
- N** Inspects, tests and/or replaces components of brake warning light system.
- O** Bleeds (manual, pressure, vacuum or surge) brake system.
- P** Diagnoses poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determines necessary action.
- Q** Demonstrates, removes, cleans, inspects and measures brake drums; determines needed action.
- R** Knowledge of brake drum service/refinishing.
- S** Demonstrates, removes, cleans and inspects brake shoes, springs, pins, clips, levers, adjusters, other related brake hardware and backing support plates. Lubricates and reassembles.
- T** Demonstrates removal, inspection and installation of wheel cylinder service.
- U** Pre-adjusts brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings.
- V** Installs wheels, torque lug nuts and makes final checks and adjustments.
- W** Diagnoses poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determines necessary action.
- X** Demonstrates removal of caliper, cleans and inspects caliper for leaks and damage to caliper housing; determines necessary action.
- Y** Cleans and inspects caliper mounting and slides for wear and damage; determines necessary action.

Hours	
Class	OJT

50.00	
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16 BRAKES II

- A** Reassembles, lubricates and reinstalls caliper, pads and related hardware; seat pads and inspects for leaks.
- B** Cleans, inspects and measures rotor with a dial indicator and a micrometer; follows manufacturer's recommendations in determining need to machine or replace.
- C** Removes and installs rotor.
- D** Refinishes rotor on vehicle.
- E** Refinishes rotor off vehicle.
- F** Adjusts calipers equipped with an integrated parking brake.
- G** Installs wheels, torque lug nuts and makes final checks and adjustments.
- H** Demonstrates and tests pedal free travel with and without engine running, checks power assist operation.
- I** Checks vacuum supply to vacuum-type booster.
- J** Inspects the vacuum-type power booster unit for vacuum leaks; inspects the check valve for proper operation; determines necessary action.
- K** Inspects and tests hydraulically assisted power brake system for leaks and proper operation; determines necessary action.
- L** Measures and adjusts master cylinder pushrod length.
- M** Diagnoses wheel bearing noises, wheel shimmy, and vibration concerns; determines necessary action.
- N** Demonstrates, removes, cleans, inspects, repacks and installs wheel bearings and replaces seals, installs hub and adjusts wheel bearing.
- O** Checks parking brake cables and components for wear, rusting, binding and corrosion; cleans, lubricates or replaces as needed.
- P** Checks parking brake operation; determines necessary action.
- Q** Checks operation of parking brake indicator light system.
- R** Checks operation of brake stop light system; determines necessary action.
- S** Demonstrates replacing wheel bearing and race.
- T** Demonstrates knowledge of wheel stud repair & replacement
- U** Demonstrates knowledge of sealed wheel bearing assembly service.
- V** Identifies and inspects antilock brake system (ABS) components; determines necessary action.
- W** Diagnoses poor stopping, wheel lock-up, abnormal pedal feel or pulsation, and noise concerns caused by the antilock brake system (ABS); determines necessary action.
- X** Diagnoses antilock brake system (ABS) electronic control (s) and components using self-diagnosis and/or recommended test equipment; determines necessary action.
- Y** Knowledge of antilock brake system depressurize/bleed.
- Z** Demonstrates, bleed the anti-lock brake systems (ABS) front and rear hydraulic circuits.

10.00	
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17 BRAKES III

- A** Removes and installs antilock brake system (ABS) electrical/electronic and hydraulic components.
- B** Tests, diagnoses and services ABS speed sensors, toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground and frequency data).
- C** Diagnoses antilock brake system (ABS) braking concerns caused by vehicle modifications (tire size, curb height, final drive ration, etc.).
- D** Identifies traction control/vehicle stability control system components.

Hours	
Class	OJT

100.00	18 ENGINE PERFORMANCE - I
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- A** Completes work order to include customer information, vehicle indentifying information, customer concern, related service history, cause and correction.
- B** Identifies and interprets engine performance concern; determines necessary action.
- C** Researches applicable vehicle and service information, such as engine management system operation, vehicle history, service precaution and technical service bulletins.
- D** Locates and interprets vehicle and major component identification numbers (VIN).
- E** Inspects engine assembly for fuel, oil, coolant and other leaks; determines necessary action.
- F** Diagnoses abnormal engine noise or vibration concerns; determines necessary action.
- G** Diagnoses abnormal exhaust color, odor and sound; determines necessary action.
- H** Performs engine absolute (vacuum/boost) manifold pressure test; determines needed repairs.
- I** Performs cylinder power balance test; determines needed repairs.
- J** Performs cylinder cranking compression test; determines needed repairs.
- K** Performs engine running compression test; determines needed repairs.
- L** Performs cylinder leakage test; determines needed repairs.
- M** Demonstrates ability to diagnose engine mechanical, electrical, fuel and ignition concerns with oscilloscope and/or engine diagnostic equipment; determines needed repairs.
- N** Demonstrates ability to prepare 4 or 5 gas analyzer; inspects and prepares vehicle for test and obtain exhaust readings; interprets readings; determines needed repairs.
- O** Verifies engine operating temperature; determines needed repairs.
- P** Performs cooling system pressure test; checks coolant condition; inspects and tests radiator, cap recovery tank and hoses; determines needed repairs.
- Q** Demonstrates ability to verify correct crankshaft timing.
- R** Demonstrates ability to retrieve and correct OBD I diagnostic trouble codes; clear codes when applicable.
- S** Demonstrates ability to retrieve and record OBD II diagnostic trouble codes; clear codes when applicable.
- T** Diagnoses emissions and driveability concerns resulting from malfunctions in the computerized engine controls with stored diagnostic codes.
- U** Diagnoses emissions and driveability concerns resulting from malfunctions in the computerized engine controls with no stored diagnostic codes; determines needed repair.
- V** Demonstrates ability to check for module communication (including CAN/BUS systems) errors using scan tool.
- W** Demonstrates ability to inspect and test computerized engine control system sensors, powertrain control (PCM), actuators, and circuits using a graphing multimeter (GMM) digital storage osilloscope (DSO); determines needed repairs.
- X** Demonstrates ability to obtain and interpret scan data.
- Y** Demonstrates ability to access and use service information to perform step-by-step diagnosis.
- Z** Diagnoses emission and driveability problems resulting from malfunctions of interrelated systems (cruse control, security, suspension, traction, A/C, transmissions, non-OBM-installed accessories, or similar systems) determines needed repair

Hours	
Class	OJT

100.00	19 ENGINE PERFORMANCE -II
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- A** Demonstrates ability to perform active test of actuators using scan tool; determines needed repairs.
- B** Diagnoses ignition system related problems: no starting, hard starting, engine misfire, poor driveability, spark knock, power loss, engine misfire, power loss, poor mileage and emissions problems on vehicles w/electronic ignition systems
- C** Diagnoses ignition systems related problems such as no start, hard start and misfire. Determines necessary action.
- D** Demonstrates ability to inspect and test ignition primary circuit wiring and solid state components; determines needed repairs.
- E** Demonstrates ability to inspect, test and service distributor.
- F** Demonstrates ability to inspect/test ignition secondary wiring and components; determines needed repairs.
- G** Demonstrates ability to inspect, test ignition coil; determines needed repairs.
- H** Demonstrates ability to check and adjust ignition timing and advance/retard.
- I** Demonstrates ability to inspect and test ignition pick-up sensor or triggering devices; determines needed repairs.
- J** Diagnoses ignition system related problems such as no starting, hard starting
- K** Checks fuel for contaminants and quality; determines necessary action.
- L** Demonstrates ability to test fuel pumps and pump control systems for pressure, regulation and volume; determines needed repairs.
- M** Demonstrates ability to replace fuel filters.
- N** Demonstrates ability to inspect and test cold enrichment system and components.
- O** Inspects throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.
- P** Inspects and tests fuel injectors.
- Q** Inspects the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s) and heat shield(s); performs necessary action.
- R** Performs exhaust system back-pressure test; determines necessary action.
- S** Demonstrates ability to test the operation of turbocharger/supercharger systems; determines needed repairs.
- T** Diagnoses oil leaks, emissions and driveability problems resulting from malfunctions in the positive crankcase ventilation (PVC) system; determines necessary action.
- U** Inspects, tests and services positive crankcase ventilation (PVC) filter/breather cap, valve, tubes. Orifices, and hoses; performs necessary action.
- V** Diagnoses emissions and driveability problems caused by malfunctions in the exhaust gas recirculation (EGR) system; determines necessary action.
- W** Inspects, tests, services and replaces components of the EGR system, including EGR tubing, exhaust passages, vacuum/pressure controls, filters and hoses; performs necessary action.
- X** Inspects and tests electrical/electronics sensors, controls and wiring of exhaust gas recirculation (EGR) systems; performs necessary action.
- Y** Diagnoses emissions and driveability problems resulting from malfunctions in the secondary air injection and catalytic converter systems; performs necessary action.
- Z** Inspects and tests mechanical components of secondary air injection systems; performs necessary action.

Hours	
Class	OJT

25.00	
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20 ENGINE PERFORMANCE - III

- A** Inspects and tests electrical/electronically-operated components and circuits of air injection systems; performs necessary action.
- B** Inspects and tests catalytic converter performance.
- C** Diagnoses emissions and driveability problems resulting from malfunctions in the evaporative emissions control system; determines necessary action.
- D** Inspects and tests components and hoses of evaporated emissions control system; determines necessary action.
- E** Interprets evaporative emission related diagnostic trouble codes (DTCs); determines necessary action.
- F** Knowledge of adjusting valves on engine with mechanical or hydraulic lifters.
- G** Demonstrates ability to remove, replace and verify camshaft timing and belt.
- H** Demonstrates ability to remove and replace thermostat.
- I** Demonstrates ability to inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams and fan control devices; determines needed repairs.
- J** Demonstrates ability to perform common fastener and thread repairs to include: removal of broken belt, restore internal and external threads, and repair internal threads with thread insert.
- K** Demonstrates ability to perform oil and filter change.
- L** Identifies hybrid vehicle internal combustion engine service precautions.

Additional Course Information

Articulation: This course articulates with Chaffey College and Citrus College

TOTAL HOURS

Class	OJT	Course
695.00	25.00	720.00