

Perris Union High School District

Course of Study

A. COURSE INFORMATION		
Course Title: <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">CTE Maintenance & Light Repair II - Auto</div> <input type="checkbox"/> New <input type="checkbox"/> Revised	Subject Area: <input type="checkbox"/> Social Science <input type="checkbox"/> English <input type="checkbox"/> Mathematics <input type="checkbox"/> Laboratory Science <input type="checkbox"/> World Languages <input type="checkbox"/> Visual or Performing Arts <input checked="" type="checkbox"/> College Prep Elective <input type="checkbox"/> Other	Grade Level <input type="checkbox"/> MS <input type="checkbox"/> HS <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 10 <input checked="" type="checkbox"/> 11 <input checked="" type="checkbox"/> 12
If revised previous course name if changed <div style="border: 1px solid black; height: 20px; width: 100%;"></div>	Is this classified as a Career Technical Education course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Transcript Course Code/Number: <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">108421/422</div> (To be assigned by Educational Services)	Required for Graduation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Meets UC/CSU Requirements? <input checked="" type="checkbox"/> IN PROGRESS <input type="checkbox"/> No	Credential Required to teach this course: <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <i>Designated Subjects: Career Technical Education - Transportation</i> <u>To be completed by Human Resources only.</u> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border: 1px solid black; padding: 5px; width: 60%; text-align: center;"> Signature </div> <div style="border: 1px solid black; padding: 5px; width: 30%; text-align: center;"> 2/6/18 Date </div> </div>	
Was this course <u>previously approved by UC for PUHSD?</u> <input type="checkbox"/> Yes <input type="checkbox"/> No (Will be verified by Ed Services)	Meets "Honors" Requirements? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Meets "AP" Requirements? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Unit Value/Length of Course: <input type="checkbox"/> 0.5 (half year or semester equivalent) <input checked="" type="checkbox"/> 1.0 (one year equivalent) <input type="checkbox"/> 2.0 (two year equivalent) <input type="checkbox"/> Other:	
Submitted by: PUHSD Educational Svcs Site: Date: 02/05/2018		
Approvals	Name/Signature	Date
Director of Curriculum & Instruction		2/6/18
Asst. Superintendent of Educational Services		2.6.18
Governing Board		

COURSE OUTLINE

Course: 12699 Maintenance & Light Repair II (Basic Automotive Service)

Articulation:

Academic Credit:

Job Title(s):

O'NET	JOB TITLE
49-3023.02	Automotive Specialty Technician
49-3093.00	Tire Repair and Changer
49-9098.00	Helpers for Installation, Maintenance and Repair
49-3023.00	Automotive Service Technicians and Mechanics
49-2096.00	Electronic Equipment Installers and Repairers, Motor Vehicles
49-3031.00	Bus and Truck Mechanics and Diesel Engine Specialists

Course Description:

Maintenance & Light Repair II (MLR) is the second course in the Automotive Maintenance and Light Repair program of study and covers important skills and knowledge on becoming a professional service technician. Students study automotive general electrical systems, starting and charging systems, batteries, lighting, and electrical accessories. Hours earned in the Maintenance and Light Repair courses may be used toward meeting National Automotive Technicians Education Foundation (NATEF) standards.

If the facility and program have earned NATEF accreditation, students completing all of the Maintenance and Light Repair courses may enter the automotive service industry as an ASE Certified MLR Technician. (NATEF requires that 95% of the P-1 tasks, 80% of the P-2 tasks, and 50% of the P-3 tasks will be accomplished. These tasks are notated in the course outlines.)

Hours:

Classroom	180	Classroom	180
Community Site (CC)	<u>0</u>	Coop VocEd (CVE)	<u>0</u>
Total:	180	Total:	180

Prerequisites:

To have the maturity to follow all safety mandates and equipment use.

Date of Last Revision: October 18, 2017

Additional Course Information:

Suggested CDE Course Code: Transportation Sector - Systems Diagnostics, Service, and Repair (Pathway-221) 8531 Intermediate Systems Diagnostics, Service, and Repair (Concentrator)

Hours		
Class	CC	CVE

Occupational Competencies

--	--	--

1 INTRODUCTION/ORIENTATION

- A Completes a course orientation.
- B Recognizes sexual harassment as defined by California and Federal Law.
- C Models effective strategies for resolving sexual harassment situations.
- D Evaluates and describes appropriate technology ethics for the workplace.
- E Selects, applies, and differentiates among appropriate tools in technology.
- F Identifies the personal qualifications, interests, aptitudes, knowledge, and skills necessary to succeed in careers
- G Adapts to various team roles and workplace responsibilities.
- H Organizes and structures work individually and in teams for effective performance and the attainment of goals.
- I Models leadership, cooperation, collaboration, and effective decision-making skills applied in group or team activities, including student organizations.
- J Demonstrates understanding of the importance of time management to fulfill responsibilities and meet deadlines.
- K Applies appropriate problem-solving strategies and critical thinking skills to work-related issues and tasks.
- L Practices conservation of classroom resources.

--	--	--

2 ETHICS AND LEGAL RESPONSIBILITIES

- A Identifies the major local, district, state, and federal regulatory agencies and entities that affect the industry and how they enforce laws and regulations.
- B Describes the concept and application of ethical and legal behavior consistent with workplace standards.
- C Models personal integrity and ethical behavior in the workplace.
- D Demonstrates how to access, analyze, and implement quality assurance information.
- E Defines ethics and explains the importance of ethical standards.

--	--	--

3 PROBLEM-SOLVING, CRITICAL THINKING, RESPONSIBILITY, AND FLEXIBILITY

- A Applies appropriate problem-solving strategies and critical thinking skills to work-related issues and tasks.
- B Understands the systematic problem-solving models that incorporate input, process, outcome, and feedback components.
- C Uses critical thinking skills to make informed decisions and solve problems.
- D Models the qualities and behaviors that constitute a positive and professional work demeanor.
- E Identifies the importance of accountability and responsibility in fulfilling personal, community, and workplace roles.
- F Adapts to varied roles and responsibilities.
- G Demonstrates that individual actions can affect the larger community.
- H Understands the importance of time management to fulfill responsibilities.
- I Demonstrates how to apply high-quality craftsmanship to a product or presentation and continually refine and perfect it.

Hours		
Class	CC	CVE

--	--	--

4 SHOP AND PERSONAL SAFETY

- A Identify general shop safety rules and procedures.
- B Utilize safe procedures for handling of tools and equipment.
- C Identify and use proper placement of floor jacks and jack stands.
- D Identify and use proper procedures for safe lift operation.
- E Utilize proper ventilation procedures for working within the lab/shop area.
- F Identify marked safety areas.
- G Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.
- H Identify the location and use of eye wash stations.
- I Identify the location of the posted evacuation routes.
- J Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.
- K Identify and wear appropriate clothing for lab/shop activities.
- L Secure hair and jewelry for lab/shop activities.
- M Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.
- N Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, inject systems, etc.).
- O Locate and demonstrate knowledge of material safety data sheets (MSDS).

--	--	--

5 TOOLS AND EQUIPMENT

- A Identify tools and their usage in automotive applications
- B Identify standards and metric designation.
- C Demonstrate safe handling and use of appropriate tools.
- D Demonstrate proper cleaning, storage, and maintenance of tools and equipment.
- E Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper).

--	--	--

6 PREPARING VEHICLE FOR SERVICE

- A Identify information needed and the service requested on a repair order.
- B Identify purpose and demonstrate proper use of fender covers, mats.
- C Demonstrate use of the three C's (concern, cause, and correction).
- D Review vehicle service history.

--	--	--

7 PREPARING VEHICLE FOR CUSTOMER

- A Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.)

Hours		
Class	CC	CVE

--	--	--

8 ENGINE REPAIR

- A Research applicable vehicle and service information, vehicle service history service precautions, and technical service bulletins.
- B Verify operation of the instrument panel engine warning indicators.
- C Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
- D Install engine covers using gaskets, seals, and sealers as required.
- E Remove and replace timing belt; verify correct camshaft timing.
- F Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.
- G Identify hybrid vehicle internal combustion engine service precautions.
- H Adjust valves (mechanical or hydraulic lifters).
- I Perform cooling system and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, and heater core; determine necessary action.
- J Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.
- K Remove, inspect, and replace thermostat and gasket/seal.

--	--	--

9 AUTOMATIC TRANSMISSION AND TRANSAXLE

- A Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins.
- B Check fluid level in a transmission or a transaxle equipped with a dip-stick.
- C Check fluid level in a transmission or a transaxle not equipped with a dip-stick.
- D Check transmission fluid condition; check for leaks.
- E Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch.
- F Inspect for leakage at external seals, gaskets, and bushing.
- G Inspect, replace, and align power train mounts.
- H Drain and replace fluid and filter(s).

--	--	--

10 MANUAL DRIVE TRAIN AND AXLES

- A Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins.
- B Drain and refill manual transmission/transaxle and final drive unit.
- C Check fluid condition; check for leaks.
- D Check and adjust clutch master cylinder fluid level.
- E Check for system leaks.
- F Describe the operational characteristics of an electronically-controlled manual transmission/transaxle.
- G Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals.
- H Inspect, service, and replace shafts, yokes, boots, and universal/CV joints.
- I Clean and inspect differential housing; check for leaks; inspect housing vent.

Hours		
Class	CC	CVE

--	--	--

11 SUSPENSION AND STEERING SYSTEMS

- A Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
- B Disable and enable supplemental restraint system (SRS).
- C Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.
- D Determine proper power steering fluid type; inspect fluid level and condition.
- E Flush, fill, and bleed power steering system.
- F Inspect for power steering fluid leakage; determine necessary action.
- G Remove, inspect, replace, and adjust power steering pump drive belt.
- H Inspect and replace power steering hoses and fittings.
- I Replace power steering pump fittings.
- J Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.
- K Inspect tie rod ends (sockets), tie rod sleeves, and clamps.
- L Inspect upper and lower control arms, bushings, and shafts.
- M Inspect and replace rebound and jounce bumpers.
- N Inspect track bar, strut rods/radius arms, and related mounts and bushings.
- O Inspect upper and lower ball joints (with or without wear indicators).
- P Inspect suspension system coil springs and spring insulators (silencers).
- Q Inspect suspension system torsion bars and mounts.

--	--	--

12 SUSPENSION AND STEERING, WHEEL ALIGNMENT, WHEELS AND TIRES

- A Perform pre-alignment inspection and measure vehicle ride height; determine necessary action.
- B Inspect tire conditions; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action.
- C Rotate tires according to manufacturer's recommendations.
- D Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).
- E Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.
- F Inspect tire and wheel assembly for air loss; perform necessary action.

Hours		
Class	CC	CVE

--	--	--

13 BRAKES

- A Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
- B Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS).
- C Install wheel and torque lug nuts.
- D Measure brake pedal height, travel, and free play (as applicable); determine necessary action.
- E Check master cylinder for external leaks and proper operation.
- F Inspect brake lines, flexible hoses, and fitting for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action.
- G Select, handle, store, and fill brake warning light system.
- H Identify components of brake warning light system.
- I Bleed and/or flush brake system.
- J Test brake fluid for contamination.
- K Remove, clean, inspect, and measure brake drum diameter; determine necessary action.
- L Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
- M Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.
- N Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments.
- O Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action.
- P Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.

--	--	--

14 BRAKES, MISCELLANEOUS

- A Check brake pedal travel with, and without, engine running to verify proper power booster operation.
- B Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.
- C Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings.
- D Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.
- E Check parking brake operation and parking brake indicator light system operation; determine necessary action.
- F Check operation of brake stop light system.

Hours		
Class	CC	CVE

--	--	--

15 ELECTRICAL/ELECTRONIC SYSTEMS, GENERAL AND BATTERY SERVICE

- A Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
- B Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).
- C Use wiring diagrams to trace electrical/electronic circuits.
- D Demonstrate proper use of a digital multi-meter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance.
- E Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.
- F Check operation of electrical circuits with a test light.
- G Check operation of electrical circuits with fused jumper wires.
- H Measure key-off battery drain (parasitic draw).
- I Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
- J Perform solder repair of electrical wiring.
- K Replace electrical connectors and terminal ends.
- L Perform battery state-of-charge test; determine necessary action.

--	--	--

16 ELECTRICAL/ELECTRONIC SYSTEMS, STARTING, CHARGING SYSTEM AND ACCESSORIES

- A Perform starter current draw test; determine necessary action.
- B Perform starter circuit voltage drop tests; determine necessary action.
- C Inspect and test starter relays and solenoids; determine necessary action.
- D Remove and install starter in a vehicle.
- E Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.
- F Perform charging system output test; determine necessary action.
- G Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment.
- H Remove, inspect, and re-install generator (alternator).
- I Perform charging circuit voltage drop tests; determine necessary action.
- J Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.

--	--	--

17 HEATING AND AIR CONDITIONING, GENERAL

- A Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
- B Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action.
- C Identify hybrid vehicle A/C system electrical circuits and the service/safety precautions.
- D Inspect A/C condenser for airflow restrictions; determine necessary action.

Hours		
Class	CC	CVE

--	--	--

18 ENGINE PERFORMANCE

- A Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
- B Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.
- C Perform cylinder power balance test; determine necessary action.
- D Perform cylinder cranking and running compression tests; determine necessary action.
- E Perform cylinder leakage test; determine necessary action.
- F Verify engine operating temperature.
- G Remove and replace spark plugs; inspect secondary ignition components for wear and damage.
- H Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.
- I Describe the importance of operating all OBDII monitors for repair verification.