MISSION VALLEY REGIONAL OCCUPATION PROGRAM

Automotive Technology 1

Course Outline

1. Course Title:

Automotive Technology 1

2. CTE Career Sector and Pathway:

Transportation Sector, 221 Systems Diagnostics, Service, and Repair

3. CALPADS Number:

WHS 8531, JLHS 8531, MVROP Center 8532

4. Job Titles/DOT Codes:

Automotive Mechanic	620.261-010
Automobile-Mechanic Helper	620.684-014
Automobile-Repair-Service Estimator	620.261-018
Automotive Technician, Exhaust Emission	620.281-014
Brake Adjuster	620.684-018

5. Course Length:

At the MVROP Center, this is a year-long course which meets 2 hours each day/360 hours and is associated with ten credits each semester. (CALPADS Code 8532-Capstone)

At James Logan High School and Washington High School, this is a year-long 1 hour course each day/180 hours and is associated with 5 credits each semester (CALPADS Code 8531-Completer)

6. Course Description:

This competency–based course prepares students for entry-level positions in the Automotive Industry. Included in the course are general auto repair, brakes, steering and suspension, electrical systems, and engine performance. Students receive hands-on experience in auto shop operations, tool usage, safety procedures, equipment operation and customer service.

7. Hours:

James Logan & Washington High School (JLHS/WHS):		Mission Valley ROP Center (ROP) Class	
Class	180 hours	Class	360 hours
CC/CVE	0 hours	CC/CVE	0 hours
Total	180 hours	TOTAL	360 hours

Date of Revision: July 2023 **Approved by Advisory:**

8. Articulation:

This course is articulated with Chabot College's ATEC 50: Introduction to Automotive Technology (3.0 Units). Students must pass the course with a B- or better to earn the college credit. This course is also articulated with Universal Technical Institute.

9. UC/CSU A-G Eligibility:

This course meets the UC/CSU A-G "g" requirement.

10. Instructional Materials

Automotive Maintenance and Light Repair 2nd Edition, Kirk VanGelder, CDX Learning Systems, 2020
Automotive Technology, 5th edition, Halderman, Pearson Publishers 2016

11. Course Outline:

Upon successful completion of this course, students will be able to demonstrate the following skills necessary for entry-level employment.

Unit	Content Area Skills	Hours
Integrated Throughout the course	**Workplace Basic Skills & Behaviors** (Necessary skills for any occupation – MVROP SLO #1) Learner Outcomes: A. Apply skills learned in class. B. Analyze information and make decisions. C. Communicate verbally and in writing. D. Work independently and as a team member in a diverse workplace. E. Work reliably, responsibly, and ethically.	Integrated Throughout the course
Integrated throughout the course	**Career Technical Skills** (Occupational competencies – MVROP SLO #2) Learner Outcomes: **A. Technology.** a. Select, operate, maintain, and troubleshoot a variety of technologies (tools, machines, and computers). b. Use computers to process information for the numerical system. **B. Safety standards** a. Comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment, and proper ventilation. b. Comply with safety and environmental practices associated with handling, storage, and disposal of chemicals or materials in accordance with local, state, and federal regulations.	Integrated throughout the course

	C. Business Functions a. Identify, organize, plan, and manage time, materials, and facilities. b. Recognize purpose for administration, operations, marketing, personnel, production, distribution, and services.	
MANDATORY FOR ALL ROP COURSES	**Career Path Strategies** (Occupational competencies – MVROP SLO # 3) Learner Outcomes: A. Develop a plan to achieve career goals. ***a. Create a Career Portfolio*** i. Cover letter ii. Application iii. Resume iv. Thank you letter B. Use effective job search strategies C. Demonstrate an awareness of the importance of lifelong learning.	Integrated throughout the course
Unit	**Course Curriculum**	**Hours**
1	**Introduction to Automotive Technology** Learner Outcomes: A. The Automobile a. Parts, Assemblies, and Systems b. Hybrid Vehicle B. Basic Hand Tools a. Tool Rules b. Tool Storage c. Wrenches, Screwdrivers, Pliers, Hammers, Chisels and Punches, d. Files, Saws e. Holding Tools f. Cleaning Tools g. Probe and Pickup Tools h. Pry Bars C. Power Tools and Equipment a. Compressed-Air System b. Air Tools c. Electric Tools d. Hydraulic Tools e. Shop Equipment - including but not limited to the safe and proper usage of vehicle hoists and service jacks.	40/80

	D. Auto Shop and Safety a. Auto Shop Layout b. Shop Safety c. Types of Accidents d. General Safety Rules e. Customer Relations E. Basic Electricity and Electronics a. Electricity b. Automotive Electronics c. Automotive Wiring d. Basic Electrical Tests e. Scan Tools F. Basic Vehicle Maintenance, Fluid Service, and Recycling a. Lubrication Service b. Vehicle Maintenance c. Fluid Service d. Filter Service e. Chassis Lubrication f. Service Intervals g. General Inspection and Problem Location h. Recycling and Disposal of Auto Shop Wastes G. Basic Online Service information a. Use of Alldata or Shop Key type online information b. Service information for repair and service procedures. c. Identify specific data information for vehicle specifications.	
2	**<u>Label Identification</u>** Learner Outcomes: A. Fluid Labels B. Emission Labels C. Vehicle Identification Number	2/4
3	**<u>29-Point Inspection</u>** Learner Outcomes: A. Engine B. Transmission C. Suspension D. Tires E. Safety Belts and Interior F. Lighting Systems	3/6

4	**Road Hazard/ Tire Replacement** Learner Outcomes: A. Road Hazards B. Freeway Hazards C. Car Jack Usage D. Flares and Signs E. Common Sense	3/6
5	**Engines** Learner Outcomes: A. Basic Engine Fundamentals a. Engine Operation b. Engine Bottom End c. Engine Top End d. Engine Front End B. Engine Design Classifications a. Engine Classifications b. Cylinder Arrangement c. Alternative Engines d. Typical Automotive Engines C. Basic Engine Diagnostic Testing a. Compression Tests b. Cylinder Leakage Tests c. Engine Vacuum Tests	70
6	**Cooling and Lubrication Systems** Learner Outcomes: A. Basic Cooling System Fundamentals a. Cooling System Functions and Operations b. Cooling System Types c. Basic Cooling System d. Closed and Open Cooling System e. Cooling System Instrumentation f. Antifreeze g. Block Heater h. Focus on Hybrids B. Basic Cooling System Testing, Maintenance, and Repair a. Cooling System Problems and Diagnosis b. Water Pump Service c. Thermostat Service d. Cooling System Hose Service e. Fan Belt Service f. Freeze Plug Service g. Coolant Service h. Flushing a Cooling System i. Temperature Gauge Service	15/30

	C. Basic Lubrication System Testing, Service, and Repair a. Lubrication System Problem Diagnosis b. Engine Oil and Filter Service c. Oil Pan Service d. PCV Valve Service e. Lubrication System Diagnosis	
7	**<u>Electrical Systems</u>** Learner Outcomes: A. Basic Automotive Batteries a. Battery Principles b. Battery Functions c. Battery Construction d. Wet- and Dry-Charged Batteries e. Maintenance-Free Battery f. Gel Battery g. Absorbed Glass Mat Battery h. Lithium Ion Batteries i. Battery Ratings j. Battery Temperature and Efficiency k. Focus on Hybrids B. Basic Battery Testing and Service a. Battery Maintenance b. Jump Starting c. Battery Load Test d. Activating Dry-Charged Battery e. Removing and Replacing a Battery f. Battery Diagnosis C. Lights, Instrumentation, Wipers, and Horns – Operation and Service a. Lighting Systems and Service b. Instrumentation c. Windshield Wipers d. Horns e. Theft-Deterrent Systems f. Finding Common Electrical Problems g. Headlamp and Turn Signal Diagnosis D. Basic Hybrid Drive System Operation and Repair a. Hybrid System Voltages b. Hybrid Drive Assemblies c. Hybrid Service Safety	15/30

8	**Engine Performance** Learner Outcomes: A. Basic Engine Tune-Up a. Engine Tune-Up b. General Tune-Up Rules c. Tune-Up Safety Rules d. Typical Tune-Up Procedures e. Diesel Engine Tune-Up (Maintenance) f. Engine Tune-Up (Maintenance) Intervals	10/20
9	**Suspension, Steering, and Brakes** Learner Outcomes: A. Tire, Wheel, and Wheel Bearing Fundamentals a. Tires and Wheels b. Valve Stems and Cores, Lug Nuts, Studs, and Bolts c. Wheel Weights d. Hub and Wheel Bearing Assemblies B. Basic Suspension System Fundamentals a. Functions of a Suspension System b. Basic Suspension System c. Independent and Non-Independent Suspension Systems d. Understeer and Oversteer e. Suspension System Springs and Construction f. Long- Short-Arm Suspension g. Torsion Bar Suspension h. MacPherson Strut Suspension i. Pickup Truck Suspension Systems j. Rear Suspension Systems C. Brake System Fundamentals a. Basic Brake System b. Braking Ratio c. Brake System Hydraulics d. Brake System Components e. Parking Brakes f. Focus on Hybrids D. Brake System Diagnosis and Repair a. Brake System Problem Diagnosis and Inspection b. Vacuum Booster Service c. Hydraulic Booster Service d. Master Cylinder Service e. Brake System Bleeding f. Brake Line and Hose Service g. Disc Brake Service h. Brake Disc (Rotor) Service	40/80

	i. Drum Brake Service j. Parking Brake Adjustment k. Brake System Diagnosis E. Basic Anti-Lock Brakes, Traction Control, and Stability Control a. Anti-Lock Brake Systems b. Traction and Stability Control Systems c. ABS Service	
10	**<u>Computer Systems</u>** Learner Outcomes: A. Basic Computer System Fundamentals a. Cybernetics b. Computer Advantages c. Digital Electronics d. Integrated Circuits e. Computer Signals f. Computer System Operation g. Sensors h. Computers i. Actuators	20/40
11	**<u>Fuels Systems</u>** Learner Outcomes: A. Automotive Fuels, Gasoline and Diesel Combustion a. Petroleum (Crude Oil) b. Gasoline c. Diesel Fuel d. Alternative Fuels B. Fuel Tanks, Pumps, Lines, and Filters a. Fuel Supply System and Service b. Fuel Delivery System Diagnosis C. Basic Gasoline Injection Diagnosis and Repair a. Gasoline Injection Problem Diagnosis b. Fuel Pressure Regulator Service c. Injector Problems D. Carburetor Operation Service a. Basic Carburetor b. Carburetor Problem Diagnosis E. Exhaust Systems, Turbochargers, and Superchargers a. Exhaust Systems and Service b. Superchargers and Turbochargers c. Accident Report	10/20

12	**<u>Heating and Air Conditioning</u>** Learner Outcomes: A. Basic Heating and Air Conditioning Service a. Inspecting an Air Conditioning System b. Refrigerant Safety Precautions c. R-134a Service Differences d. 1234YF Service Differences – Including safety precautions e. Testing an Air Conditioning System f. Recovering Refrigerant **Writing and Completing Repair Order documents** B. Completing Work Order for work performed a. Identify the necessary information included in a R/O (work order) b. Understand the necessity of parts list contained in a R/O c. Understand the process necessary for additional approved work. d. Understand the closure process of a R/O e. Review the "Write it Right" standards of state BAR (2018).	10/20
	Total Hours	**180/360**

12. Instructional Strategies

Lecture	Reading Assignments	Demonstration
Group Discussion	Oral Questioning	Team Learning
Brainstorming	Multimedia	Simulation
Projects	Hands-on Practice	Virtual Reality
Written Tests	Presentations	Skill Practical Assessments
Performance Exams	Portfolios	

13. Certificate Competency List:

Career Preparation Standards:

- Apply workplace basic skills and behaviors
- Practice occupational safety standards
- Demonstrate effective job employment skills

Career Technical Skills:

- Demonstrates safe working conditions in classroom and shop
- Identify common automotive tools and equipment
- Demonstrate proper usage of tools and equipment
- Perform vehicle safety inspection
- Check fluids accurately and describe their operational systems
- Perform engine oil and filter service and chassis lubrication
- Demonstrate proper use of scan tools
- Perform tire rotation, repair and replacement
- Perform wheel bearing service
- Perform disk brake service
- Perform drum brake service
- Complete repair order accurately
- Demonstrate part removal and replacement
- Use appropriate methods for disposal of hazardous waste material