Mission Valley Regional Occupational Program
Automotive Technology 1
Course Outline

COURSE TITLE:

Automotive Technology 1

CBEDS TITLE:

Automotive Mechanics

CBEDS NUMBER:

5655

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

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.

HOURS:

James Logan & Washington High School (JLHS/WHS)

Class	180
CC	0
CVE	0
TOTAL	**180**

Mission Valley ROP Center (ROP)

Class	360
CC	0
CVE	0
TOTAL	**360**

DATE OF REVISION:

November 9, 2017

DATE OF RE-APPROVED:

October 29, 2020

COURSE OUTLINE: ***CLASS HOURS (JLHS&WHS/ROP):***

I. Career Preparation Standards

(Necessary skills for any occupation – MVROP ESLR #1)

WORKPLACE BASIC SKILLS AND BEHAVIORS *(Integrated throughout course)*

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

II. Career Technical Skills

(Occupational competencies – MVROP ESLR #2)

a. Technology *(Integrated throughout course)*

i. Select, operate, maintain, and troubleshoot a variety of technologies (tools, machines, and computers).
ii. Use computers to process information for the numerical system.

b. Safety Standards *(Integrated throughout course)*

i. Comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment, and proper ventilation.
ii. Comply with safety and environmental practices associated with handling, storage, and disposal of chemicals or materials in accordance with local, state, and federal regulations.

c. Business Functions *(Integrated throughout course)*

i. Identify, organize, plan, and manage time, materials, and facilities.
ii. Recognize purpose for administration, operations, marketing, personnel, production, distribution, and services.

III. Career Path Strategies

(Strategic planning for a career – MVROP ESLR #3)

JOB EMPLOYMENT SKILLS *(Integrated throughout course)*

a. Develop a plan to achieve career goals
b. Use effective job search strategies
c. Demonstrate an awareness of the importance of lifelong learning

IV. Course Curriculum

a. **Introduction to Automotive Technology** *(40/80 hours)*
   i. The Automobile
      1. Parts, Assemblies, and Systems
      2. Hybrid Vehicle
   ii. Basic Hand Tools
      1. Tool Rules
      2. Tool Storage
      3. Wrenches, Screwdrivers, Pliers, Hammers, Chisels and Punches, Files, Saws
      4. Holding Tools
      5. Cleaning Tools
      6. Probe and Pickup Tools
      7. Pry Bars
   iii. Power Tools and Equipment
      1. Compressed-Air System
      2. Air Tools
      3. Electric Tools
      4. Hydraulic Tools
      5. Shop Equipment - including but not limited to the safe and proper usage of vehicle hoists and service jacks.
   iv. Auto Shop and Safety
      1. Auto Shop Layout
      2. Shop Safety
      3. Types of Accidents
      4. General Safety Rules
      5. Customer Relations
   v. Basic Electricity and Electronics
      1. Electricity
      2. Automotive Electronics
      3. Automotive Wiring
      4. Basic Electrical Tests
      5. Scan Tools
   vi. Basic Vehicle Maintenance, Fluid Service, and Recycling
      1. Lubrication Service
      2. Vehicle Maintenance
      3. Fluid Service
      4. Filter Service
      5. Chassis Lubrication
      6. Service Intervals
      7. General Inspection and Problem Location
      8. Recycling and Disposal of Auto Shop Wastes
   vii. Basic Online Service information
      1. Use of Alldata or Shop Key type online information
      2. Service information for repair and service procedures.

3. Identify specific data information for vehicle specifications.

b. **Label Identification** *(2/4 hours)*
   i. Fluid Labels
   ii. Emission Labels
   iii. Vehicle Identification Number

c. **29-Point Inspection** *(3/6 hours)*
   i. Engine
   ii. Transmission
   iii. Suspension
   iv. Tires
   v. Safety Belts and Interior
   vi. Lighting Systems

d. **Road Hazard/Tire Replacement** *(5/10 hours)*
   i. Road Hazards
   ii. Freeway Hazards
   iii. Car Jack Usage
   iv. Flares and Signs
   v. Common Sense

e. **Engines** *(10/20 hours)*
   i. Basic Engine Fundamentals
      1. Engine Operation
      2. Engine Bottom End
      3. Engine Top End
      4. Engine Front End
   ii. Engine Design Classifications
      1. Engine Classifications
      2. Cylinder Arrangement
      3. Alternative Engines
      4. Typical Automotive Engines
   iii. Basic Engine Diagnostic Testing
      1. Compression Tests
      2. Cylinder Leakage Tests
      3. Engine Vacuum Tests

f. **Cooling and Lubrication Systems** *(15/30 hours)*
   i. Basic Cooling System Fundamentals
      1. Cooling System Functions and Operations
      2. Cooling System Types
      3. Basic Cooling System
      4. Closed and Open Cooling System
      5. Cooling System Instrumentation
      6. Antifreeze
      7. Block Heater
      8. Focus on Hybrids
   ii. Basic Cooling System Testing, Maintenance, and Repair

1. Cooling System Problems and Diagnosis
2. Water Pump Service
3. Thermostat Service
4. Cooling System Hose Service
5. Radiator and Pressure Cap Service
6. Fan Belt Service
7. Freeze Plug Service
8. Coolant Service
9. Flushing a Cooling System
10. Temperature Gauge Service

iii. Basic Lubrication System Testing, Service, and Repair
1. Lubrication System Problem Diagnosis
2. Engine Oil and Filter Service
3. Oil Pan Service
4. PCV Valve Service
5. Lubrication System Diagnosis

g. **Electrical Systems** *(15/30 hours)*

i. Basic Automotive Batteries
1. Battery Principles
2. Battery Functions
3. Battery Construction
4. Wet- and Dry-Charged Batteries
5. Maintenance-Free Battery
6. Gel Battery
7. Absorbed Glass Mat Battery
8. Lithium Ion Batteries
9. Battery Ratings
10. Battery Temperature and Efficiency
11. Focus on Hybrids

ii. Basic Battery Testing and Service
1. Battery Maintenance
2. Jump Starting
3. Battery Load Test
4. Activating Dry-Charged Battery
5. Removing and Replacing a Battery
6. Battery Diagnosis

iii. Lights, Instrumentation, Wipers, and Horns – Operation and Service
1. Lighting Systems and Service
2. Instrumentation
3. Windshield Wipers
4. Horns
5. Theft-Deterrent Systems
6. Finding Common Electrical Problems
7. Headlamp and Turn Signal Diagnosis

iv. Basic Hybrid Drive System Operation and Repair
    1. Hybrid System Voltages
    2. Hybrid Drive Assemblies
    3. Hybrid Service Safety

h. **Engine Performance** *(10/20 hours)*
    i. Basic Engine Tune-Up
        1. Engine Tune-Up
        2. General Tune-Up Rules
        3. Tune-Up Safety Rules
        4. Typical Tune-Up Procedures
        5. Diesel Engine Tune-Up (Maintenance)
        6. Engine Tune-Up (Maintenance) Intervals

i. **Suspension, Steering, and Brakes** *(40/80 hours)*
    i. Tire, Wheel, and Wheel Bearing Fundamentals
        1. Tires and Wheels
        2. Valve Stems and Cores, Lug Nuts, Studs, and Bolts
        3. Wheel Weights
        4. Hub and Wheel Bearing Assemblies
    ii. Basic Suspension System Fundamentals
        1. Functions of a Suspension System
        2. Basic Suspension System
        3. Independent and Non-Independent Suspension Systems
        4. Understeer and Oversteer
        5. Suspension System Springs and Construction
        6. Long- Short-Arm Suspension
        7. Torsion Bar Suspension
        8. MacPherson Strut Suspension
        9. Pickup Truck Suspension Systems
        10. Rear Suspension Systems
    iii. Brake System Fundamentals
        1. Basic Brake System
        2. Braking Ratio
        3. Brake System Hydraulics
        4. Brake System Components
        5. Parking Brakes
        6. Focus on Hybrids
    iv. Brake System Diagnosis and Repair
        1. Brake System Problem Diagnosis and Inspection
        2. Vacuum Booster Service
        3. Hydraulic Booster Service
        4. Master Cylinder Service
        5. Brake System Bleeding
        6. Brake Line and Hose Service
        7. Disc Brake Service

8. Brake Disc (Rotor) Service
9. Drum Brake Service
10. Parking Brake Adjustment
11. Brake System Diagnosis

v. Basic Anti-Lock Brakes, Traction Control, and Stability Control
1. Anti-Lock Brake Systems
2. Traction and Stability Control Systems
3. ABS Service

j. **Computer Systems** *(20/40 hours)*

i. Basic Computer System Fundamentals
1. Cybernetics
2. Computer Advantages
3. Digital Electronics
4. Integrated Circuits
5. Computer Signals
6. Computer System Operation
7. Sensors
8. Computers
9. Actuators

k. **Fuels Systems** *(10/20 hours)*

i. Automotive Fuels, Gasoline and Diesel Combustion
1. Petroleum (Crude Oil)
2. Gasoline
3. Diesel Fuel
4. Alternative Fuels

ii. Fuel Tanks, Pumps, Lines, and Filters
1. Fuel Supply System and Service
2. Fuel Delivery System Diagnosis

iii. Basic Gasoline Injection Diagnosis and Repair
1. Gasoline Injection Problem Diagnosis
2. Fuel Pressure Regulator Service
3. Injector Problems

iv. Carburetor Operation Service
1. Basic Carburetor
2. Carburetor Problem Diagnosis

v. Exhaust Systems, Turbochargers, and Superchargers
1. Exhaust Systems and Service
2. Superchargers and Turbochargers
3. Accident Report

l. Heating and Air Conditioning *(10/20 hours)*

i. Basic Heating and Air Conditioning Service
1. Inspecting an Air Conditioning System
2. Refrigerant Safety Precautions
3. R-134a Service Differences

4. 1234YF Service Differences – Including safety precautions
5. Testing an Air Conditioning System
6. Recovering Refrigerant

M. Writing and Completing Repair Order documents

i. Completing Work Order for work performed

1. Identify the necessary information included in a R/O (work order)
2. Understand the necessity of parts list contained in a R/O
3. Understand the process necessary for additional approved work.
4. Understand the closure process of a R/O
5. Review the "Write it Right" standards of state BAR (2018).

TOTAL COURSE APPROVED HOURS = 180/360

ADDITIONAL ITEMS:

a. **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.

b. **UC/CSU A-G Eligibility:** This course does not meet the UC/CSU A-G requirements.

c. **Instructional Strategies:**

- Lecture
- Group Discussion
- Projects
- Reading Assignments
- Oral Questioning
- Multi-Media
- Hands-on Practice
- Demonstration
- Team Learning
- Simulation

d. Instructional Materials:

- *Modern Automotive Technology, 7th edition, Duffy, G-W Publishers, 2009. (WHS)*
- *Modern Automotive Technology, 8th edition, Duffy, G-W Publishers, 2014. (MVROP)*
- *Automotive Technology, 5th edition, Halderman, Pearson Publishers 2016 (JLHS)*
- *Auto Maintenance and Light Repair Video Clip Library, G-W Publishers, 2015*

e. Completion Certificate Competencies

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