MISSION VALLEY REGIONAL OCCUPATIONAL PROGRAM
AUTOMOTIVE TECHNOLOGY
COURSE OUTLINE

1. Course Title:

Automotive Technology 1 & 2

2. CBEDS Title:

Automotive Mechanics

3. CBEDS Number:

5655

4. Job Titles/DOT Codes:

Automobile 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 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.

6. Hours:

Class	720 (2 year program)
Total Hour	**720**

7. Prerequisites:

Automotive Technology 1 – None.
Automotive Technology 2 – C or better grade in Automotive Technology 1
or instructor's approval

8. Date of Revision:

November 10, 2016

9. Course Outline:

			Class
		Career Preparation Standards Necessary skills for any occupation *(MVROP ESLR #1)*	**Class**
I.		**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.	
		Career Technical Skills Occupational competencies *(MVROP ESLR #2)*	
II.		**Technology**	Integrated throughout course
	A.	Select, operate, maintain, and troubleshoot a variety of technologies (tools, machines, and computers).	
	B.	Use computers to process information for the numerical system.	
III.		**Safety Standards**	Integrated throughout course
	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.	
IV.		**Business Functions**	Integrated throughout course
	A.	Identify, organize, plan, and manage time, materials, and facilities.	
	B.	Recognize purpose for administration, operations, marketing, personnel, production, distribution, and services.	
		Career Path Strategies Strategic planning for a career *(MVROP ESLR #3)*	
V.		**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.	

			Class
VI.		**Introduction to Automotive Technology**	**160**
	A.	The Automobile	
		1. Parts, Assemblies, and Systems	
		2. Hybrid Vehicle	
	B.	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	
	C.	Power Tools and Equipment	
		1. Compressed-Air System	
		2. Air Tools	
		3. Electric Tools	
		4. Hydraulic Tools	
		5. Shop Equipment	
	D.	Auto Shop and Safety	
		1. Auto Shop Layout	
		2. Shop Safety	
		3. Types of Accidents	
		4. General Safety Rules	
		5. Customer Relations	
	E.	Basic Electricity and Electronics	
		1. Electricity	
		2. Automotive Electronics	
		3. Automotive Wiring	
		4. Basic Electrical Tests	
		5. Scan Tools	
	F.	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.		**Label Identification**	**8**
		1. Fluid Labels	
		2. Emission Labels	
		3. Vehicle Identification Number	
VIII.		**29-Point Inspection**	**12**
		1. Engine	
		2. Transmission	
		3. Suspension	
		4. Tires	
		5. Safety Belts and Interior	
		6. Lighting Systems	

			Class
IX.		**Road Hazard/Tire Replacement**	**20**
		1. Road Hazards	
		2. Freeway Hazards	
		3. Car Jack Usage	
		4. Flares and Signs	
		5. Common Sense	
X.		**Engines**	**40**
	A.	Engine Fundamentals	
		1. Engine Operation	
		2. Engine Bottom End	
		3. Engine Top End	
		4. Engine Front End	
	B.	Engine Design Classifications	
		1. Engine Classifications	
		2. Cylinder Arrangement	
		3. Alternative Engines	
		4. Typical Automotive Engines	
	C.	Engine Diagnostic Testing	
		1. Compression Tests	
		2. Cylinder Leakage Tests	
		3. Engine Vacuum Tests	
XI.		**Cooling and Lubrication Systems**	**60**
	A.	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	
	B.	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. Engine Fan Service	
		8. Freeze Plug Service	
		9. Coolant Service	
		10. Flushing a Cooling System	
		11. Temperature Gauge Service	
	C.	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	

			Class
XII.		**Electrical Systems**	**60**
	A.	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. Battery Ratings	
		9. Battery Temperature and Efficiency	
		10. Focus on Hybrids	
	B.	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	
	C.	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	
	D.	Hybrid Drive System Operation and Repair	
		1. Hybrid System Voltages	
		2. Hybrid Drive Assemblies	
		3. Hybrid Service Safety	
		4. Hybrid Problem Diagnosis	
		5. Hybrid Battery Pack Service	
		6. Checking HV Battery Relays and Contactors	
		7. Servicing Hybrid Power Cables	
		8. Servicing the Power Control Module	
		9. Servicing the Hybrid Cooling System	
		10. Servicing the Motor-Generator	
		11. Hybrid Wiring Problems	
XIII.		**Engine Performance**	**40**
	A.	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	
XIV.		**Suspension, Steering, and Brakes**	**160**
	A.	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	

			Class
	B.	Suspension System Fundamentals	
		1. Functions of a Suspension System	
		2. Basic Suspension System	
		3. Independent and Nonindependent 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	
		11. Suspension Leveling Systems	
		12. Electronic Suspension System	
		13. Active Suspension System	
	C.	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	
	D.	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	
	E.	Anti-Lock Brakes, Traction Control, and Stability Control	
		1. Anti-Lock Brake Systems	
		2. Traction and Stability Control Systems	
		3. ABS Service	
		4. Traction and Stability Control System Service	
		5. Final System Check	
		6. Anti-Lock Brake and Traction Control System Diagnosis	
XV.		**Computer Systems**	**80**
	A.	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	

			Class
	B.	On-Board Diagnostic and Scan Tools	
		1. On-Board Diagnostic System	
		2. Scanning Computer Problems	
		3. Energizing OBD I Systems without a Scan Tool	
		4. Erasing Trouble Codes	
XVI.		**Fuel Systems**	**40**
	A.	Automotive Fuels, Gasoline and Diesel Combustion	
		1. Petroleum (Crude Oil)	
		2. Gasoline	
		3. Diesel Fuel	
		4. Alternative Fuels	
	B.	Fuel Tanks, Pumps, Lines, and Filters	
		1. Fuel Supply System and Service	
		2. Fuel Delivery System Diagnosis	
	C.	Gasoline Injection Diagnosis and Repair	
		1. Gasoline Injection Problem Diagnosis	
		2. Fuel Pressure Regulator Service	
		3. Injector Problems	
		4. Throttle Body Injector Service	
		5. Servicing EFI Multiport Injectors	
		6. Engine Sensor Service	
		7. Multiport Throttle Body Service	
		8. Gasoline Injection System Diagnosis	
	D.	Carburetor Operation Service	
		1. Basic Carburetor	
		2. Carburetor Problem Diagnosis	
	E.	Exhaust Systems, Turbochargers, and Superchargers	
		1. Exhaust Systems and Service	
		2. Superchargers and Turbochargers	
		3. Accident Report	
XVII		**Heating and Air Conditioning**	**40**
	A.	Heating and Air Conditioning Service	
		1. Inspecting an Air Conditioning System	
		2. Refrigerant Safety Precautions	
		3. R-134a Service Differences	
		4. Testing an Air Conditioning System	
		5. Recovering Refrigerant	
		6. Common A/C Component Problems	
		7. Evacuating and Charging an Air Conditioning System	
		8. Adding Refrigerant Oil	
		9. A/C System Service Rules	
		10. Heater and Electronic Climate Control Service	
		11. Climate Control System Diagnosis	
		Hours	**720**
		Total Approved Course Hours	**720**

10. Additional Items:

a. Articulation: Automotive Technology 2 is articulated with Chabot College's ATEC 50: Introduction to Automotive Technology (3.0 Units) (Expires 6/30/2018). Students must pass the course with a B or better to earn the college credit.

b. UC/CSU A-G Status: 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
- Simulations

d. Instructional Materials:

- *Modern Automotive Technology, 7th edition, Duffy, G-W Publishers, 2009. (WHS, JLHS)*
- *Modern Automotive Technology, 8th edition, Duffy, G-W Publishers, 2014. (MVROP/C)*
- *Auto Maintenance and Light Repair Video Clip Library, G-W Publishers, 2015*
- *Hybrid Automotive Series I DVDs, G-W Publishers, 2007*

e. Certification:

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
- Perform engine oil and filter service and chassis lubrication
- Demonstrate proper use of scan tools
- Perform tire repair and replacement
- Perform wheel bearing service
- Perform disc brake service
- Perform drum brake service
- Complete repair order accurately
- Demonstrate part removal and replacement
- Use appropriate methods for disposal of hazardous waste material