Maryland CTE Programs of Study

Automotive Technology II (2025)

GENERAL REQUIREMENTS. This course is recommended for students in Grades 11 and 12. Prerequisite: Automotive Technology I: Maintenance and Light Repair. Students shall be awarded one credit for successful completion of this course. 1

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INTRODUCTION. 2

A Career and Technical Education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions. 2.A

B The Supply Chain and Transportation Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance. 2.B

C Automotive Technology II: Automotive Service includes knowledge of the major automotive systems and the principles of diagnosing and servicing these systems. Automotive Technology II: Automotive Service includes applicable safety and environmental rules and regulations. In this course, students will gain knowledge and skills in the repair, maintenance, and diagnosis of vehicle systems. This study will allow students to reinforce, apply, and transfer academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings. The focus of this course is to teach safety, tool identification, proper tool use, and employability. 2.C

D Students will participate in a Career Preparation Work-Based Learning experience in this course, which might include paid or unpaid internship experiences relevant to the program of study. 2.D

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Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular

organizations. 2.E

KNOWLEDGE AND SKILLS. 3

A The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to: 3.A

1. Demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace such as wearing safety glasses and other personal protective equipment (PPE) and maintaining safety data sheets (SDS). 3.A.1
2. Identify employment opportunities, including entrepreneurship opportunities and internships, and industry-recognized certification requirements for the field of automotive technology. 3.A.2
3. Demonstrate the principles of group participation, team concept, and leadership related to citizenship and career preparation. 3.A.3
4. Apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the automotive technology industry. 3.A.4
5. Discuss certification opportunities. 3.A.5
6. Discuss response plans to emergency situations. 3.A.6
7. Identify employers' expectations and appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills. 3.A.7
8. Develop personal goals, objectives, and strategies as part of a plan for future career and educational opportunities. 3.A.8

B The student relates core academic skills to the requirements of automotive technology. The student is expected to: 3.B

1. Demonstrate effective written communication skills throughout the course, including documenting on a repair order customer concern/compliant, root cause of the failure, and corrective action to complete the repair. 3.B.1
2. Estimate the cost of parts and labor operations on repair orders throughout the course, including the flat rate system. 3.B.2
3. Demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate. 3.B.3
4. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. 3.B.4

C The student demonstrates the technical knowledge and skills that form the core of knowledge of automotive service. The student is expected to: 3.C

1. Diagnose the major components of powered vehicles. 3.C.1
2. Diagnose automotive chassis and driveline components. 3.C.2
3. Locate, read, and interpret documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair information and technical bulletins. 3.C.3

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4 Locate the manufacturer recommended preventative maintenance schedule. 3.C.4

5 Perform a preventative maintenance inspection. 3.C.5

6 Perform common fastener and thread repair, including removing broken bolt, restoring internal and external threads, and repairing internal threads with thread insert. 3.C.6

7 Perform precision measurements and use published specifications to diagnose component wear and determine necessary repairs. 3.C.7

8 Employ critical-thinking skills and structured problem-solving skills to diagnose vehicle malfunctions, solve problems, and make decisions. 3.C.8

D The student knows the functions and applications of the tools, equipment, technologies, and materials used in automotive technology. The student is expected to: 3.D

1 Demonstrate the proper and safe use of hand and power tools and equipment commonly employed in the maintenance and repair of vehicles. 3.D.1

2 Discuss and demonstrate the proper handling and disposal of environmentally hazardous materials used in servicing vehicles, 3.D.2

3 Demonstrate proper use of diagnostic tools and equipment. 3.D.3

4 Locate, read, and interpret service repair information such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair bulletins. 3.D.4

E The student applies the technical knowledge and skills related to suspension in simulated or actual work situations. The student is expected to: 3.E

1 Inspect and replace power steering hoses and fittings. 3.E.1

2 Remove, clean, inspect, repack, and install wheel bearings. 3.E.2

3 Replace seals; install hubs; and adjust bearings. 3.E.3

4 Replace wheel bearing and race. 3.E.4

5 Disable and enable supplemental restraint system (SRS). 3.E.5

6 Inspect, remove, and replace shock absorbers and struts and inspect mounts and bushings. 3.E.6

7 Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system (TPMS). 3.E.7

8 Inspect rear suspension system lateral links/arms, trailing arms, leaf springs, spring insulators, shackles, brackets, center pins, and mounting bolts. 3.E.8

9 Inspect tire condition and wear patterns, check for correct size and application based on load and speed rating, and adjust air pressure. 3.E.9

10 Perform pre-alignment inspection and measure vehicle ride height. 3.E.10

11 Inspect tire and wheel assembly for air loss. 3.E.11

2 Identify and test indirect and direct TPMSs and operation of the instrument panel lamps. 3.E.12

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13 Demonstrate knowledge of steps required to remove and replace sensors in a TPMS. 3.E.13

14 Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, seals, shafts, boots, and universal/constant velocity (CV) joints. 3.E.14

F The student applies the technical knowledge and skills related to electrical systems in simulated or actual work situations. The student is expected to: 3.F

1 Demonstrate knowledge of the causes and effects from shorts, opens, and resistance in electrical/electronic circuits. 3.F.1

2 Measure key-off battery drain/parasitic draw. 3.F.2

3 Perform solder repair of electrical wiring. 3.F.3

4 Replace electrical connectors and terminal ends. 3.F.4

5 Demonstrate the ability to maintain or restore electronic memory functions. 3.F.5

6 Perform slow and fast battery charges according to manufacturer recommendations. 3.F.6

7 Identify electronic modules, security systems, radios, and other accessories that require re- initialization or code entry after reconnecting a vehicle battery. 3.F.7

8 Perform starter current draw test and starter circuit voltage drop tests and inspect and test starter relays and solenoids. 3.F.8

9 Remove and install a starter in a vehicle. 3.F.9

10 Inspect and test switches, connectors, and wires of starter control circuits. 3.F.10

11 Perform charging system output test. 3.F.11

12 Remove, inspect, and re-install alternator. 3.F.12

13 Identify system voltage and safety precautions associated with high-intensity discharge headlights. 3.F.13

14 Disable and enable airbag system for vehicle service and verify indicator lamp operation. 3.F.14

15 Remove and reinstall a door panel. 3.F.15

16 Describe the operation of keyless entry and remote-start systems. 3.F.16

G The student applies the technical knowledge and skills related to brakes in simulated or actual work situations. The student is expected to: 3.G

1 Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS). 3.G.1

2 Measure brake pedal height, reserve distance, travel, and free play. 3.G.2

3 Identify components of brake warning light system 3.G.3

4 Bleed and flush brake system. 3.G.4

5 Identify and check the operation of brake stop light system. 3.G.5

6 Identify traction control and vehicle stability control system components. 3.G.6

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H **The student applies the technical knowledge and skills related to engine performance in simulated or actual work situations. The student is expected to:** 3.H

1. Describe the importance of operating all on board diagnostics II (OBDII) monitors for repair verification. 3.H.1
2. Perform cylinder power balance test. 3.H.2
3. Perform cylinder cranking and running compression tests. 3.H.3
4. Perform cylinder leakage test. 3.H.4
5. Verify engine operating temperature. 3.H.5
6. Remove and replace spark plugs and inspect secondary ignition components for wear and damage. 3.H.6
7. Retrieve and record diagnostic trouble codes and OBD II monitor status, freeze frame data, and clear trouble codes when applicable. 3.H.7

I **The student applies the technical knowledge and skills related to engines in simulated or actual work situations. The student is expected to:** 3.I

1. Install engine covers using gaskets, seals, and sealers as required. 3.I.1
2. Remove and replace timing belt and verify correct camshaft timing. 3.I.2
3. Perform cooling system pressure and dye tests to identify leaks, check coolant condition and level, and inspect and test radiator, pressure cap, coolant recovery tank, and heater core. 3.I.3
4. Remove, inspect, and replace thermostat and gasket or seal. 3.I.4

J **The student applies the technical knowledge and skills related to heating ventilation and air conditioning (HVAC) in simulated or actual work situations. The student is expected to:** 3.J

1. Identify, locate, and replace cabin air filters. 3.J.1
2. Inspect air conditioning (A/C) condenser for airflow restrictions. 3.J.2
3. Identify the source of A/C system odors. 3.J.3
4. Identify hybrid vehicle A/C system electrical circuits and safety precautions. 3.J.4

K **The student develops technology skills. The student is expected to:** 3.K

1. Use technology as a tool to research, organize, evaluate, and communicate information. 3.K.1
2. Use digital technologies (computers, PDAs, media players, GPSs, etc.); communication/ networking tools, and social networks appropriately to access, manage; integrate, evaluate, and create information to successfully function in a knowledge economy. 3.K.2
3. Demonstrate using current and new technologies specific to the program of study, course, and/or industry. 3.K.3

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4 Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information technologies. 3.K.4