



Department of Teaching & Learning
Parent/Student Course Information

Automotive Service Technology II
(VO8507)

Three Credits, One Year
Grades 11 or 12

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION

In this course, students explore, handle, and perform basic functions in engine repair, automatic transmission and transaxle, manual drive train and axles, suspension and steering systems, and brakes. Students who successfully complete the Automotive Technology program may be eligible to take the Automotive Service Excellence (ASE) Student Certification examination. The ASE Student Certification is the first step in building a career as a service professional in the automotive industry.

CERTIFICATION

Automotive Service Excellence Examinations (ASE)

ASE Entry Level Technician Examinations

Virginia Motor Vehicle Safety Inspection Program Examination

Environmental Protection Agency (EPA): Safety and Pollution Prevention Certification

STUDENT ORGANIZATION

SkillsUSA is a co-curricular organization for all students enrolled in trade and industrial education programs. SkillsUSA is a partnership of students, teachers and industry working together to ensure America has a skilled workforce. SkillsUSA helps students excel by providing educational programs, events and competitions that support career and technical education (CTE) in the nation's classrooms. Students are highly encouraged to participate.

PREREQUISITE

Auto Service Technology I

OPTIONS FOR NEXT COURSE

None

REQUIRED STUDENT TEXTBOOK

None

COMPETENCIES FOR AUTO SERVICE TECHNOLOGY II

Demonstrating Personal Qualities and Abilities

- 1 Demonstrate creativity and innovation.
- 2 Demonstrate critical thinking and problem solving.
- 3 Demonstrate initiative and self-direction.
- 4 Demonstrate integrity.
- 5 Demonstrate work ethic.

Demonstrating Interpersonal Skills

- 6 Demonstrate conflict-resolution skills.
- 7 Demonstrate listening and speaking skills.
- 8 Demonstrate respect for diversity.
- 9 Demonstrate customer service skills.
- 10 Collaborate with team members.

Demonstrating Professional Competencies

- 11 Demonstrate big-picture thinking.
- 12 Demonstrate career- and life-management skills.
- 13 Demonstrate continuous learning and adaptability.
- 14 Manage time and resources.
- 15 Demonstrate information-literacy skills.
- 16 Demonstrate an understanding of information security.
- 17 Maintain working knowledge of current information-technology (IT) systems.
- 18 Demonstrate proficiency with technologies, tools, and machines common to a specific occupation.
- 19 Apply mathematical skills to job-specific tasks.
- 20 Demonstrate professionalism.
- 21 Demonstrate reading and writing skills.
- 22 Demonstrate workplace safety.

Examining All Aspects of an Industry

- 23 Examine aspects of planning within an industry/organization.
- 24 Examine aspects of management within an industry/organization.
- 25 Examine aspects of financial responsibility within an industry/organization.
- 26 Examine technical and production skills required of workers within an industry/organization.
- 27 Examine principles of technology that underlie an industry/organization.
- 28 Examine labor issues related to an industry/organization.
- 29 Examine community issues related to an industry/organization.
- 30 Examine health, safety, and environmental issues related to an industry/organization.

Addressing Elements of Student Life

- 31 Identify the purposes and goals of the student organization.
- 32 Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.
- 33 Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects.
- 34 Identify Internet safety issues and procedures for complying with acceptable use standards.

Exploring Work-Based Learning

- 35 Identify the types of work-based learning (WBL) opportunities.
- 36 Reflect on lessons learned during the WBL experience.
- 37 Explore career opportunities related to the WBL experience.
- 38 Participate in a WBL experience, when appropriate.

REQUIRED SUPPLEMENTAL TASKS

Lab/Shop and Personal Safety

- 39 Identify general lab/shop safety rules and procedures.
- 40 Utilize safe procedures for handling tools and equipment.
- 41 Identify and use proper placement of floor jacks and jack stands.
- 42 Identify and use proper procedures for safe lift operation.
- 43 Use proper ventilation procedures for working in the lab/shop area.
- 44 Identify marked safety areas.
- 45 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.
- 46 Identify the location and use of eye wash stations.
- 47 Identify the location of posted evacuation routes.
- 48 Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.
- 49 Identify and wear appropriate clothing for lab/shop activities.
- 50 Secure hair and jewelry for lab/shop activities.
- 51 Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high-voltage circuits.
- 52 Demonstrate awareness of the safety aspects of high-voltage circuits such as high intensity discharge (HID) lamps, ignition systems, and injection systems.
- 53 Locate and demonstrate knowledge of safety data sheets (SDS).

ENGINE REPAIR

General

- 54 Install engine covers using gaskets, seals, and sealers as required.
- 55 Verify engine mechanical timing.
- 56 Verify operation of the instrument panel engine warning indicators.
- 57 Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
- 58 Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.

Cylinder Head and Valve Train

- 59 Adjust valves (mechanical or hydraulic lifters).
- 60 Identify components of the cylinder head and valve train.

AUTOMATIC TRANSMISSION AND TRANSAXLE

In-Vehicle Transmission/Transaxle

- 61 Inspect, adjust, and/or replace external manual valve shift linkage, transmission range sensor/switch, and/or park/neutral position switch.
- 62 Inspect for leakage at external seals, gaskets, and bushings.
- 63 Inspect, replace, and/or align power train mounts.

Off-Vehicle Transmission and Transaxle

- 64 Describe the operational characteristics of a continuously variable transmission (CVT).
- 65 Describe the operational characteristics of a hybrid vehicle drive train.

MANUAL DRIVE TRAIN AND AXLES

Transmission/Transaxle

- 66 Describe the operational characteristics of an electronically-controlled manual transmission/transaxle. Drive Shaft, Half Shafts, Universal Joints, and Constant-Velocity (CV) Joints (Front, Rear, All, and Four-wheel Drive)
- 67 Inspect, remove, and/or replace bearings, hubs, and seals.
- 68 Inspect, service, and/or replace shafts, yokes, boots, and universal/constant-velocity (CV) joints.
- 69 Inspect locking hubs.
- 70 Check for leaks at drive assembly and transfer case seals; check vents; check fluid level; use proper fluid type per manufacturer specification.

Differential Case Assembly

- 71 Clean and inspect differential case; check for leaks; inspect housing vent.

SUSPENSION AND STEERING SYSTEMS

General

- 72 Disable and enable supplemental restraint system (SRS).

Wheel Alignment

- 73 Perform prealignment inspection; measure vehicle ride height.
- 74 Describe alignment angles (camber, caster, and toe).

BRAKES

Electronic Brakes, Traction Control, and Stability Control Systems

- 75 Identify traction control/vehicle stability control system components.
- 76 Describe the operation of a regenerative braking system.

ELECTRICAL/ELECTRONIC SYSTEMS

General

- 77 Research vehicle service information, including vehicle service history, service precautions, and technical service bulletins.
- 78 Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's law).
- 79 Identify lane departure and radar cruise systems.
- 80 Use wiring diagrams to trace electrical/electronic circuits.
- 81 Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance.
- 82 Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.
- 83 Check operation of electrical circuits using a test light.
- 84 Use fused jumper wires to check operation of electrical circuits.
- 85 Measure key-off battery drain (parasitic draw).
- 86 Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
- 87 Repair and/or replace connectors, terminal ends, and wiring of electrical/electronic systems (including solder repair).

Battery Service

- 88 Perform battery state-of-charge test; determine necessary action.
- 89 Confirm proper battery capacity for vehicle application; perform battery capacity and load test; determine necessary action.
- 90 Maintain or restore electronic memory functions.
- 91 Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.

- 92 Perform slow/fast battery charge according to manufacturer's recommendations.
- 93 Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.
- 94 Identify safety precautions for high-voltage systems on electric, hybrid-electric, and diesel vehicles.
- 95 Identify electrical/electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.
- 96 Identify hybrid vehicle auxiliary (12V) battery service, repair, and test procedures.

Starting System

- 97 Perform starter current draw test; determine necessary action.
- 98 Perform starter circuit voltage drop tests; determine necessary action.
- 99 Inspect and test starter relays and solenoids; determine necessary action.
- 100 Remove and install starter in a vehicle.
- 101 Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.
- 102 Demonstrate knowledge of an automatic idle-stop/start-stop system.

Charging System

- 103 Perform charging system output test; determine necessary action.
- 104 Inspect, adjust, and/or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment.
- 105 Remove, inspect, and/or replace generator (alternator).
- 106 Perform charging circuit voltage drop tests; determine necessary action.

Lighting, Instrument Cluster, Driver Information, and Body Electrical Systems

- 107 Inspect interior and exterior lamps and sockets, including headlights and auxiliary lights (fog lights/driving lights); replace as needed.
- 108 Aim headlights.
- 109 Identify system voltage and safety precautions associated with high-intensity discharge (HID) headlights.
- 110 Disable and enable supplementary restraint system (SRS); verify indicator lamp operation.
- 111 Remove and reinstall door panel.
- 112 Describe the operation of keyless entry/remote-start systems.
- 113 Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators.
- 114 Verify windshield wiper and washer operation; replace wiper blades.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

General

- 115 Research vehicle service information, including refrigerant/oil type, vehicle service history, service precautions, and technical service bulletins.
- 116 Identify heating, ventilation and air conditioning (HVAC) components and configuration.

Refrigeration System Components

- 117 Inspect and replace air conditioning (AC) compressor drive belts, pulleys, and tensioners; visually inspect AC components for signs of leaks; determine needed action.
- 118 Identify hybrid vehicle AC system electrical circuits and the service/safety precautions.
- 119 Inspect AC condenser for airflow restrictions; determine necessary action.

Heating, Ventilation, and Engine Cooling Systems

- 120 Inspect engine cooling and heater system hoses and pipes; determine necessary action.

Operating Systems and Related Controls

- 121 Inspect AC-heater ducts, doors, hoses, cabin filters, and outlets; determine necessary action.

122 Identify the source of HVAC system odors.

ENGINE PERFORMANCE

General

- 123 Research vehicle service information, including fuel type, vehicle service history, service precautions, and technical service bulletins.
- 124 Perform engine absolute manifold pressure tests (vacuum/boost); document results.
- 125 Perform cylinder power balance test; document results.
- 126 Perform cylinder cranking and running compression tests; document results.
- 127 Perform cylinder leakage test; document results.
- 128 Verify engine operating temperature.
- 129 Remove and replace spark plugs; inspect secondary ignition components for wear and damage.

Computerized Engine Controls

- 130 Retrieve and record diagnostic trouble codes (DTC), on-board diagnostic (OBD) monitor status, and freeze frame data; clear codes when applicable.
- 131 Describe the use of the OBD monitors for repair verification.

Fuel, Air Induction, and Exhaust Systems

- 132 Replace fuel filter(s) where applicable.
- 133 Inspect, service, or replace air filters, filter housings, and intake duct work.
- 134 Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action.
- 135 Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; determine necessary action.
- 136 Check and refill diesel exhaust fluid (DEF).

Emissions Control Systems

- 137 Inspect, test, and service positive crankcase ventilation (PCV) filter/breather, valve, tubes, orifices, and hoses; perform necessary action.

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Produced by the Department of Teaching and Learning.
For further information, please call (757) 263-1070.

Notice of Non-Discrimination Policy

Virginia Beach City Public Schools does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation/gender identity, pregnancy, childbirth or related medical condition, disability, marital status, age, genetic information or veteran status in its programs, activities, employment, or enrollment, and provides equal access to the Boy Scouts and other designated youth groups. School Board policies and regulations (including, but not limited to, Policies 2-33, 4-4, 5-7, 5-19, 5-20, 5-44, 6-33, 6-7, 7-48, 7-49, 7-57 and Regulations 4-4.1, 4-4.2, 5-44.1, 7-11.1, 7-17.1 and 7-57.1) provide equal access to courses, programs, enrollment, counseling services, physical education and athletic, vocational education, instructional materials, extracurricular activities and employment.

Title IX Notice: Complaints or concerns regarding discrimination on the basis of sex or sexual harassment should be addressed to the Title IX Coordinator, at the VBCPS Office of Student Leadership, 641 Carriage Hill Road, Suite 200, Virginia Beach, 23452, (757) 263-2020, Mary.Dees@vbschools.com (student complaints) or the VBCPS Department of School Leadership, 2512 George Mason Drive, Municipal Center, Building 6, Virginia Beach, Virginia, 23456 (757) 263-1088, Elizabeth.Bryant@vbschools.com (employee complaints). Additional information regarding Virginia Beach City Public Schools' policies regarding discrimination on the basis of sex and sexual harassment, as well as the procedures for filing a formal complaint and related grievance processes, can be found in School Board Policy 5-44 and School Board Regulations 5-44.1 (students), School Board Policy 4-4 and School Board Regulation 4-4.3 (employees), and on the School Division's website at [Diversity, Equity and Inclusion/Title IX](#). Concerns about the application of [Section 504 of the Rehabilitation Act](#) should be addressed to the Section 504 Coordinator/Executive Director of Student Support Services at (757) 263-1980, 2512 George Mason Drive, Virginia Beach, Virginia, 23456 or the Section 504 Coordinator at the student's school. For students who are eligible or suspected of being eligible for special education or related services under IDEA, please contact the Office of Programs for Exceptional Children at (757) 263-2400, Plaza Annex/Family and Community Engagement Center, 641 Carriage Hill Road, Suite 200, Virginia Beach, VA 23452.

The School Division is committed to providing educational environments that are free of discrimination, harassment, and bullying. Students, staff, parents/guardians who have concerns about discrimination, harassment, or bullying should contact the school administration at their school. Promptly reporting concerns will allow the school to take appropriate actions to investigate and resolve issues. School Board Policy 5-7 addresses non-discrimination and anti-harassment, Policy 5-44 addresses sexual harassment and discrimination based on sex or gender. Policy 5-36 and its supporting regulations address other forms of harassment.

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