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
This two-year program includes the study of engine repair, engine performance, electricity/electronics, brakes, steering and suspension. In the classroom students will study automotive theory and apply these principles to practical use in the lab. The program prepares graduates to pursue ASE certification as well as provides them the opportunity to participate in the AYES (Automotive Youth Educational Systems) program, which begins with an internship in the summer of their junior year.

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 Workplace Readiness Skills: Personal Qualities and People Skills
1. Demonstrate positive work ethic.
2. Demonstrate integrity.
3. Demonstrate teamwork skills.
4. Demonstrate self-representation skills.
5. Demonstrate diversity awareness.
6. Demonstrate conflict-resolution skills.
7. Demonstrate creativity and resourcefulness.

Demonstrating Workplace Readiness Skills: Professional Knowledge and Skills
8. Demonstrate effective speaking and listening skills.
9. Demonstrate effective reading and writing skills.
10. Demonstrate critical-thinking and problem-solving skills.
11. Demonstrate healthy behaviors and safety skills.
12. Demonstrate an understanding of workplace organizations, systems, and climates.
13. Demonstrate lifelong-learning skills.
14. Demonstrate job-acquisition and advancement skills.
15. Demonstrate time-, task-, and resource-management skills.
16. Demonstrate job-specific mathematics skills.
17. Demonstrate customer-service skills.

Demonstrating Workplace Readiness Skills: Technology Knowledge and Skills
18. Demonstrate proficiency with technologies common to a specific occupation.
19. Demonstrate information technology skills.
20. Demonstrate an understanding of Internet use and security issues.
21. Demonstrate telecommunications skills.

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

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

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

General
Install engine covers using gaskets, seals, and sealers as required.
Verify engine mechanical timing.
Verify operation of the instrument panel engine warning indicators.
Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
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
Adjust valves (mechanical or hydraulic lifters).
Identify components of the cylinder head and valve train.

In-Vehicle Transmission/Transaxle
Inspect, adjust, and/or replace external manual valve shift linkage, transmission range sensor/switch, and/or park/neutral position switch.
Inspect for leakage at external seals, gaskets, and bushings.

In-Vehicle Transmission/Transaxle
Inspect, replace, and/or align power train mounts.

Off-Vehicle Transmission and Transaxle
Describe the operational characteristics of a continuously variable transmission (CVT).
Describe the operational characteristics of a hybrid vehicle drive train.

Transmission/Transaxle
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)
Inspect, remove, and/or replace bearings, hubs, and seals.
Inspect, service, and/or replace shafts, yokes, boots, and universal/constant-velocity (CV) joints.
Inspect locking hubs.
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
Clean and inspect differential case; check for leaks; inspect housing vent.

General
Disable and enable supplemental restraint system (SRS).

Wheel Alignment
Perform prealignment inspection; measure vehicle ride height.
Describe alignment angles (camber, caster, and toe).

Electronic Brakes, Traction Control, and Stability Control Systems
Identify traction control/vehicle stability control system components.
Describe the operation of a regenerative braking system.
Research vehicle service information, including vehicle service history, service precautions, and technical service bulletins.

Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm’s law).

Identify lane departure and radar cruise systems.

Use wiring diagrams to trace electrical/electronic circuits.

Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance.

Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.

Check operation of electrical circuits using a test light.

Use fused jumper wires to check operation of electrical circuits.

Measure key-off battery drain (parasitic draw).

Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.

Repair and/or replace connectors, terminal ends, and wiring of electrical/electronic systems (including solder repair).

**Battery Service**

Perform battery state-of-charge test; determine necessary action.

Confirm proper battery capacity for vehicle application; perform battery capacity and load test; determine necessary action.

Maintain or restore electronic memory functions.

Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.

Perform slow/fast battery charge according to manufacturer recommendations.

Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.

Identify safety precautions for high-voltage systems on electric, hybrid-electric, and diesel vehicles.

Identify electrical/electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.

Identify hybrid vehicle auxiliary (12V) battery service, repair, and test procedures.

**Starting System**

Perform starter current draw test; determine necessary action.

Perform starter circuit voltage drop tests; determine necessary action.

Inspect and test starter relays and solenoids; determine necessary action.

Remove and install starter in a vehicle.

Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.

Demonstrate knowledge of an automatic idle-stop/start-stop system.

**Charging System**

Perform charging system output test; determine necessary action.

Inspect, adjust, and/or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment.

Remove, inspect, and/or replace generator (alternator).

Perform charging circuit voltage drop tests; determine necessary action.

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

Inspect interior and exterior lamps and sockets, including headlights and auxiliary lights (fog lights/driving lights); replace as needed.

Aim headlights.

Identify system voltage and safety precautions associated with high-intensity discharge (HID) headlights.

Disable and enable supplementary restraint system (SRS); verify indicator lamp operation.

Remove and reinstall door panel.

Describe the operation of keyless entry/remote-start systems.
Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators.

Verify windshield wiper and washer operation; replace wiper blades.

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

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

Heating, Ventilation, and Engine Cooling Systems
Inspect engine cooling and heater system hoses and pipes; determine necessary action.

Operating Systems and Related Controls
Inspect AC-heater ducts, doors, hoses, cabin filters, and outlets; determine necessary action.
Identify the source of HVAC system odors.

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

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

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

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

Local Competencies
Following State Safety Inspection Procedures
Remove old inspection sticker.
Drive vehicle into inspection lane.
Inspect brakes.
Inspect parking brake.
Inspect headlights.
Inspect other lights.
Inspect signal device.
Inspect steering and suspension.
Inspect tires, wheels, and rims.
Inspect mirror.
Inspect horn.
Inspect windshield and other glass.
Inspect windshield wiper/defroster.
Inspect exhaust system.
Inspect license tags.
Inspect hood and area under the hood.
Inspect air pollution control system.
Inspect driver's seat.
Inspect seat belts.
Inspect doors at the right and left sides of the driver's seat.
Inspect fuel system.
Inspect floor pan.
Issue sticker, if approved.
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 and activities 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, 6-7, 6-33, 7-48, 7-49, 7-57 and Regulations 2-33.1, 4-4.1, 4-4.2, 4-4.3, 4-6.1, 5-44.1, 7-11.1, 7-17.1 and 7-57.1) provide equal access to courses, programs, counseling services, physical education and athletic, vocational education, instructional materials and extracurricular activities.

To seek resolution of grievances resulting from alleged discrimination or to report violations of these policies, please contact the Title VI/Title IX Coordinator/Director of Student Leadership at (757) 263-2020, 1413 Laskin Road, Virginia Beach, Virginia, 23451 (for student complaints) or the Section 504/ADA Coordinator/Chief Human Resources Officer at (757) 263-1133, 2512 George Mason Drive, Municipal Center, Building 6, Virginia Beach, Virginia, 23456 (for employees or other citizens). 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, Laskin Road Annex, 1413 Laskin Road, Virginia Beach, Virginia, 23451.

Alternative formats of this publication which may include taped, Braille, or large print materials are available upon request for individuals with disabilities. Call or write The Department of Teaching and Learning, Virginia Beach City Public Schools, 2512 George Mason Drive, P.O. Box 6038, Virginia Beach, VA 23456-0038. Telephone 263-1070 (voice); fax 263-1424; 263-1240 (TDD) or email at Brandon.Martin@vbschools.com.

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