Automotive Engine Repair and Performance I

Course Credit	1.0
Grade Levels	9-12
Prerequisites	Automotive Technology Foundations is required as a prerequisite or a corequisite.

Automotive Engine Repair and Performance I is designed to equip students with foundational knowledge and skills regarding safety, engines, and engine performance. Standards are designed to equip students to diagnose and repair engine performance related systems. This course incorporates personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment, ventilation, and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

Content standards are written to meet Automotive Service Excellence (ASE) Education Foundation requirements, which also specify task lists, program hours, and safety standards.

Career and Technical Student Organizations are integral, co-curricular components of each career and technical education course. These organizations enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and access opportunities for personal and professional growth. Students in the Transportation, Distribution and Logistics career cluster affiliate with SkillsUSA.

Foundational standards, shown in the table below, are an important part of every course. Through these standards, students learn and apply safety concepts, explore career opportunities and requirements, practice the skills needed to succeed in the workplace, develop leadership qualities and take advantage of the opportunities afforded by Career and Technical Student Organizations (CTSOs), and learn and practice essential digital literacy skills. The foundational standards are to be incorporated throughout the course.

Each foundational standard completes the stem *"**Students will**..."*

Foundational Standards	
	1. Incorporate safety procedures in handling, operating, and maintaining tools and machinery; handling materials; utilizing personal protective equipment; maintaining a safe work area; and handling hazardous materials and forces. 2. Demonstrate effective workplace and employability skills, including communication, awareness of diversity, positive work ethic, problem-solving, time management, and teamwork.

	3. Explore the range of careers available in the field and investigate their educational requirements, and demonstrate job-seeking skills including resume-writing and interviewing. 4. Advocate and practice safe, legal, responsible, and ethical use of information and technology tools specific to the industry pathway. 5. Participate in a Career and Technical Student Organization (CTSO) to increase knowledge and skills and to enhance leadership and teamwork. 6. Apply literacy, mathematical, and scientific principles and precision measurements when diagnosing problems and making repairs. 7. Work independently, collaboratively, and in teams to explore concerns, find causes, and take appropriate action by applying principles of STEM.

AUTOMOTIVE ENGINE REPAIR AND PERFORMANCE I CONTENT STANDARDS

Each content standard completes the stem *"**Students will**..."*

General Engine Repair	1. Inspect engine assembly for fuel, oil, coolant, and other leaks to determine necessary action. 2. Install engine covers, using gaskets, seals, and sealers as required. 3. Verify engine mechanical timing.
Cylinder Head and Valve Train	4. Identify components of the cylinder head and valve train, and adjust valves (mechanical or hydraulic lifters).

Lubrication and Cooling Systems	5. Perform cooling system pressure and dye tests to identify leaks, including checking coolant condition and level, inspecting and testing radiator, pressure cap, coolant recovery tank, heater core, and galley plugs, to determine necessary action. 6. Remove, inspect, and replace the thermostat and gasket and seal. 7. Inspect and test coolant. a. Drain and recover coolant. b. Flush and refill cooling system. c. Select proper fluid type per manufacturer specification for cooling systems. d. Bleed air from cooling systems as required. 8. Identify components of the lubrication and cooling systems.
Engine Performance	9. Perform tests for engine absolute manifold pressure (vacuum and boost), power balance, and cylinder leakage and compression (cranking and running) and document results. 10. Remove and replace spark plugs and inspect secondary ignition components for wear and damage.
Computerized Controls	11. Retrieve and record diagnostic trouble codes (DTC), on-board diagnostics monitor status, and freeze frame data, and clear codes when applicable. 12. Describe the use of on-board diagnostics monitors for repair verification.
Fuel, Air Induction, and Exhaust Systems	13. Inspect, service, or replace fuel and air filters, filter housings, and intake ductwork. 14. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), exhaust system hangers, brackets, clamps, catalytic converter(s), resonator(s), tail pipe(s), and heat shields to determine necessary action. 15. Check and refill diesel exhaust fluid (DEF).

Emissions Control Systems	16. Inspect, test, and service positive crankcase ventilation (PCV) filter and breather, valve, tubes, orifices, and hoses and perform necessary action.