Automotive Technology Foundations

Course Credit	1.0
Grade Levels	9-12
Prerequisites	

Automotive Technology Foundations is designed to equip students with basic knowledge and skills regarding safety, engine repair, automatic transmissions, and manual drive trains. A major focus of this course is system and component operations. Standards are designed to equip students to diagnose and repair engine performance related systems. Because it is the foundation for all other automotive technology courses, Automotive Technology Foundations is a prerequisite or corequisite for Level I courses.

This course incorporates personal and environmental safety practices associated with clothing and 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 TECHNOLOGY FOUNDATIONS CONTENT STANDARDS

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

Safety, Hand Tools, and Shop Equipment

1. Identify and demonstrate proper use of marked safety areas including vehicle traffic, fire extinguisher locations, evacuation routes, eyewash stations and material Safety Data Sheets in automotive factories and facilities.
2. Explain the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, high intensity discharge (HID) lamps, ignition and fuel injection high voltage circuits for both traditional and hybrid vehicles.
3. Demonstrate safe workshop practices while using tools and equipment including floor jacks, jack stands, overhead vehicle lifts, and exhaust removal systems.

	4. Identify hand tools appropriate to the operation at hand (metric and standard) including precision measurement tools. *Examples: tape measure, vernier calipers, micrometers, diameter and pitch gauges* a. Demonstrate proper cleaning, sorting, and storage of tools.
Preparing Vehicle for Service	5. Demonstrate the use, removal, and storage or disposal of fender and steering wheel covers and floor mats. 6. Complete work order forms that include customer information; vehicle identifying information; customer concern(s), cause, and correction (3Cs); related service history; and technical service bulletins.
Transmission and Transaxle	7. Identify automatic and manual drive train components and configurations. a. Check fluid level in a transmission or a transaxle equipped with or without a dip-stick including assessment of the fluid condition, inspection for leakage at seals, gaskets, drain, refilling fluid and replacement of filters. 8. Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor and switch, and park and neutral position switch. 9. Inspect, replace, and align powertrain mounts. 10. Drain and replace fluid and filter(s) according to manufacturer specifications. 11. Describe the operational characteristics of a continuously variable transmission (CVT), an electronically controlled manual transmission, and a hybrid vehicle drivetrain.
Manual Drivetrain and Axles	12. Check and adjust clutch master cylinder fluid level, using fluid type specified by the manufacturer, and inspect for leaks. 13. Inspect, remove, and replace bearings, hubs, and seals for drive shafts, universal joints, and constant-velocity joints, including front-wheel, rear-wheel, all-wheel, and four-wheel drives, locking hubs, and wheel studs.

	14. Check for leaks at drive assembly, transfer case and differential seals, check vents, fluid level, drain, and refill with manufacturer specified fluid.
Electrical Systems	15. Perform battery replacement including performance of slow and fast charge, inspection of connections, attachment of hardware, restoration of memory functions, and initializing modules.
HVAC	16. Inspect A/C and heater ducts, doors, hoses, cabin filters, and outlets to determine the cause of heating, ventilation, and air conditioning system odors.
Engine Repair	17. Verify instrument panel warning indicators and reset maintenance reminders. 18. Perform fastener and thread repair. 19. Inspect pulleys, idlers, tensioners, and belts of engine-driven accessories. 20. Change engine oil and filters.
Engine Performance	21. Retrieve and clear diagnostic trouble codes using a scan tool.