Automotive Brake, Suspension, and Steering Repair II

Course Credit	1.0
Grade Levels	10-12
Prerequisites	Automotive Brake, Suspension, and Steering Repair I

Automotive Brake, Suspension, and Steering Repair II is designed to equip students with service knowledge and skills regarding diagnosis and repair of automotive brake, steering, and suspension systems. This course incorporates standards that address 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 BRAKE, SUSPENSION, AND STEERING REPAIR II CONTENT STANDARDS

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

General Brakes	
	1. Identify and interpret brake system concerns to determine needed action. a. Diagnose poor stopping, pulling, or dragging caused by malfunctions in the hydraulic system to determine needed action.

Hydraulic System Diagnosis and Repair	2. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's law). 3. Measure brake pedal height, travel, and free play (as applicable) to determine needed action. 4. Remove, bench bleed, and reinstall the master cylinder. 5. Replace brake lines, hoses, fittings, and supports. 6. Fabricate brake lines using approved material and flaring procedures, including double flare and ISO types. 7. Inspect, test, and replace components of the brake warning light system.
Drum Brake Diagnosis and Repair	8. Determine causes and remedial action for poor stopping, noise, vibration, pulling, grabbing, dragging, or pedal pulsation. 9. Remove, clean, and inspect brake drums, measure diameter of brake drums, and determine serviceability of brake drums.
Suspension and Steering Systems	10. Identify and interpret suspension and steering system concerns to determine needed action. 11. Remove, inspect, service, and replace front and rear wheel bearings.
Wheels and Tires Diagnosis	12. Diagnose wheel vibration, shimmy, and noise and tire pull problems to determine needed action. 13. Measure wheel, tire, axle flange, and hub runout to determine needed action.
Wheel Alignment	14. Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns to determine needed action.

Diagnosis, Adjustment, and Repair	15. Perform pre-alignment inspection, including measuring vehicle ride height, to determine needed action. 16. Prepare vehicle for wheel alignment on alignment machine, perform four-wheel alignment by checking and adjusting front and rear wheel caster, camber, and toe as required and center steering wheel. 17. Check toe-out on turns (turning radius), steering axis inclination (SAI) and included angle, rear wheel thrust angle, front wheel setback, and front and rear cradle (subframe) alignment to determine needed action. 18. Reset steering angle sensor.
Steering Systems Diagnosis and Repair	19. Remove and replace steering wheel and center and time supplemental restraint system (SRS) coil (clock spring). 20. Diagnose steering column noises, looseness, and binding concerns, including tilt and telescoping mechanisms, to determine needed action. 21. Diagnose power steering gear binding, uneven turning effort, looseness, hard steering, and noise concerns to determine needed action. 22. Inspect steering shaft universal joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel to determine needed action. 23. Remove and replace rack and pinion steering gear and inspect mounting bushings and brackets. 24. Remove and reinstall power steering pump, press fit power steering pump pulley, and check pulley and belt alignment.
Suspension Systems Diagnosis and Repair	25. Diagnose short and long arm and strut suspension system noises, body sway, and uneven ride height concerns to determine needed action. 26. Inspect, remove, and replace strut rods, bushings and steering knuckle assemblies.