COURSE INFORMATION

Course Prefix/Number: AUT 124
Course Title: Steering, Suspension and Alignment
Lecture Hours/Week: 2.0
Lab Hours/Week: 6.0
Credit Hours/Semester: 4.0

VA Statement/Distance Learning Attendance
Textbook Information
Student Code and Grievance Policy
Attendance Statement (3-30-4000.1)

COURSE DESCRIPTION

This course is the study of the fundamentals of steering, suspension and alignment and includes inspection, diagnostics, maintenance and repair of systems.

COURSE/MODULE COMPETENCIES

Upon successful completion of this course, the student should be competent to perform the following tasks:

Module 1: SUSPENSION AND STEERING-General: Suspension and Steering Systems
  • Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. (P-1)
  • Identify and interpret suspension and steering system concerns; determine necessary action. (P-1)

SUSPENSION AND STEERING-Steering Systems Diagnosis and Repair
  • Disable and enable supplemental restraint system (SRS). (P-1)
  • Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring). (P-1)
  • Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action. (P-2)
  • Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action. (P-2)
  • Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action. (P-2)
  • Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action. (P-2)
  • Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets. (P-2)
• Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots; replace as needed. (P-2)
• Determine proper power steering fluid type; inspect fluid level and condition. (P-1)
• Flush, fill, and bleed power steering system. (P-2)
• Inspect for power steering fluid leakage; determine necessary action. (P-1)
• Remove, inspect, replace, and adjust power steering pump drive belt. (P-1)
• Remove and reinstall power steering pump. (P-2)
• Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment. (P-2)
• Inspect and replace power steering hoses and fittings. (P-2)
• Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper. (P-2)
• Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps. (P-1)
• Test and diagnose components of electronically-controlled steering systems using a scan tool; determine necessary action. (P-3)
• Identify hybrid vehicle power steering system electrical circuits and safety precautions. (P-2)
• Inspect electric power-assisted steering. (P-3)

Module 2: SUSPENSION AND STEERING-Suspension Systems Diagnosis and Repair

Part 1
• Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action. (P-1)
• Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action. (P-1)
• Inspect, remove and install upper and lower control arms, bushings, shafts, and rebound bumpers. (P-3)
• Inspect, remove and install strut rods and bushings. (P-3)
• Inspect, remove and install upper and/or lower ball joints (with or without wear indicators). (P-2)
• Inspect, remove and install steering knuckle assemblies. (P-3)
• Inspect, remove and install short and long arm suspension system coil springs and spring insulators. (P-3)
• Inspect, remove and install torsion bars and mounts. (P-3)
• Inspect, remove and install front stabilizer bar (sway bar) bushings, brackets, and links. (P-3)
• Inspect, remove and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount. (P-3)
• Inspect, remove and install track bar, strut rods/radius arms, and related mounts and bushings. (P-3)
• Inspect rear suspension system leaf spring(s), bushings, center pins/bolts, and mounts. (P-1)

Module 2: SUSPENSION AND STEERING-Related Suspension & Steering Service Part 2
• Inspect, remove, and replace shock absorbers; inspect mounts and bushings. (P-1)
• Remove, inspect, and service or replace front and rear wheel bearings. (P-1)
• Describe the function of the power steering pressure switch. (P-3)
Module 3: SUSPENSION AND STEERING-Wheel Alignment Diagnosis, Adjustment, and Repair

- Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action. (P-1)
- Perform prealignment inspection and measure vehicle ride height; perform necessary action. (P-1)
- 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; center steering wheel. (P-1)
- Check toe-out-on-turns (turning radius); determine necessary action. (P-2)
- Check SAI (steering axis inclination) and included angle; determine necessary action. (P-2)
- Check rear wheel thrust angle; determine necessary action. (P-1)
- Check for front wheel setback; determine necessary action. (P-2)
- Check front and/or rear cradle (subframe) alignment; determine necessary action. (P-3)
- Reset steering angle sensor (P-2)

Module 4: SUSPENSION AND STEERING-Wheels and Tires Diagnosis and Repair

- Inspect tire condition; identify tire wear patterns; check for correct tire size and application (load and speed ratings) and adjust air pressure; determine necessary action. (P-1)
- Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action. (P-2)
- Rotate tires according to manufacturer’s recommendations. (P-1)
- Measure wheel, tire, axle flange, and hub runout; determine necessary action. (P-2)
- Diagnose tire pull problems; determine necessary action. (P-2)
- Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic). (P-1)
- Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. (P-2)
- Inspect tire and wheel assembly for air loss; perform necessary action. (P-1)
- Repair tire using internal patch. (P-1)
- Identify and test tire pressure monitoring system (indirect and direct) for operation; calibrate system; verify operation of instrument panel lamps. (P-2)
- Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system. (P-1)

METHODS OF INSTRUCTION

Methods of classroom instruction include lectures, online discussions, videos and guest speakers. Lab instruction is performed on live vehicles. Students are responsible for diagnosing customer complaints, repairing the vehicle and completing a work order for each job.

MINIMAL STANDARDS

A minimum grade of “C” is required for all classes in the Automotive Technology Degree Program.
COURSE REQUIREMENTS

Students will be expected to participate in class discussions, to demonstrate problem-solving techniques, to complete tests, homework, lab experiments, lab reports and other assigned work.

Academic Integrity
The policies stated in the York Technical College Catalog & Handbook will be enforced. Any student violating these policies will be subject to academic discipline

EVALUATION STRATEGIES/GRADING METHODS

Tests may be written or oral and may contain questions that are true or false, short answer, multiple-choice, fill in the blank and/or problems. Students should refer to the instructor for the number of tests to be given and the material to be covered on each test. Each test will be of equal weight unless otherwise indicated by the instructor. Lab grades will be based on the completion of the Course Competencies, team work, safety, class participation, and housekeeping.

Work Attitude
Work attitude will be evaluated by the following criteria:
- Adherence to safety rules and regulations
- Initiative to complete the assigned tasks
- Demonstration of critical thinking skills
- Ability to work well in groups
- Punctuality and preparation for class
- Participation in class
- Cleanliness of self and work area
- Tool inspection
- Attitude
- Ability to follow directions

Tool Policy
Student tools are required for class and periodic tool box checks will be made. Tool boxes should be complete with all tools described in the York Tech Automotive Program Tool list. Tool box checks will be part of the class grade. Failure to meet the requirements shall result in a 10% shop grade reduction.

Evaluation Method
Test Grade Average .......................50%
Lab performance/work attitude .........50%
Total .............................................100%

Grading Scale

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<tr>
<th>Grade</th>
<th>Range</th>
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<tr>
<td>A</td>
<td>90 - 100</td>
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<td>B</td>
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<td>D</td>
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ENTRY-LEVEL SKILLS

Students should demonstrate hand eye coordination, manual dexterity, and be able to work in an industrial environment.

PREREQUISITES

RDG-100, MAT-031, and ENG-031

CO-REQUISITES

AUT-161

Disabilities Statement

Any student who feels s/he may need an accommodation based on the impact of a disability should contact the Special Resources Office (SRO) at 803-327-8007 in the 300 area of Student Services. The SRO coordinates reasonable accommodations for students with documented disabilities.