

COURSE PREFIX /NO: **AUT 121**
COURSE TITLE: **SUSPENSION AND STEERING**
LEC HRS/WEEK: **1.0**
LAB HRS/WEEK: **6.0**
CREDIT HRS/SEMESTER: **3.0**

[DL ATTENDANCE/VA STATEMENT](#)
[TEXTBOOK INFORMATION](#)

COURSE DESCRIPTION

This course covers the fundamentals of suspension and steering systems, including struts, springs, shock absorbers, stabilizers, ball joints, and related parts.

COURSE COMPETENCIES

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

Module 1. General Suspension and Steering System Diagnosis

1. Identify and interpret suspension and steering concerns; determine necessary action.
2. Research applicable vehicle and service information, such as suspension and steering operation, vehicle service history, service precautions, and technical service bulletins.
3. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals).

Module 2. Steering Systems Diagnosis and Repair

1. Disable and enable supplemental restraint system (SRS) in accordance with manufacturer's procedures.
2. Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil in accordance with manufacturer's procedures.
3. Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action.

4. Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and fluid leakage concerns; determine necessary action.
5. Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and fluid leakage concerns; determine necessary action.
6. Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action.
7. Adjust manual or power non-rack and pinion worm bearing preload and sector lash.
8. Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets.
9. Disassemble, inspect, perform necessary action and reassemble rack and pinion steering gear.
10. Adjust manual or power rack and pinion steering gear.
11. Inspect and replace manual or power rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.
12. Inspect power steering fluid levels and condition.
13. Flush, fill, and bleed power steering system.
14. Diagnose power steering fluid leakage; determine necessary action.
15. Remove, inspect, replace, and adjust power steering pump belt.
16. Remove, inspect, and replace power steering pump, mounts, seals, and gaskets.
17. Remove, inspect, and replace power steering pump pulley; check alignment.
18. Inspect and replace power steering hoses and fittings.
19. Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.

20. Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.
21. Diagnose and adjust components of electronically controlled steering systems; determine necessary action.

Module 3. Front Suspension

1. Diagnose short and long arm suspension system noises, body sway, and uneven riding height concerns; determine necessary action.
2. Diagnose MacPherson strut suspension system noises, body sway, and uneven riding height concerns; determine necessary action.
3. Remove, inspect, and install upper and lower control arms, bushings, shafts, and rebound bumpers.
4. Remove, inspect, install, and adjust strut (compression/tension) rods and bushings.
5. Remove, inspect, and install upper and lower ball joints on short and long arm suspension systems.
6. Remove, inspect, and install steering knuckle assemblies.
7. Remove, inspect, and install short and long arm suspension system coil springs and spring insulators.
8. Remove, inspect, install, and adjust suspension system torsion bars; inspect mounts.
9. Remove, inspect, and install stabilizer bar bushings, brackets, and links.
10. Remove, inspect and install MacPherson strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.
11. Lubricate suspension and steering systems.

Module 4. Rear Suspension

1. Remove, inspect, and install coil springs and spring insulators.
2. Remove, inspect, and install transverse links, control arms, bushings, and mounts.
3. Remove, inspect, and install leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings, and mounts.
4. Remove, inspect, and install MacPherson strut cartridge or assembly, strut coil spring, and insulators (silencers).

Module 5. Miscellaneous Service

1. Inspect, remove, and replace shock absorbers.
2. Remove, inspect, and service or replace front and rear wheel bearings.
3. Diagnose, inspect, adjust, repair or replace components of electronically controlled suspension systems.

Module 6. Wheel Alignment Diagnosis, Adjustment, and Repair

1. Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action.
2. Perform prealignment inspection; perform necessary action.
3. Measure vehicle-riding height; determine necessary action.
4. Check and adjust front and rear wheel camber; perform necessary action.
5. Check and adjust caster; perform necessary action.
6. Check and adjust front wheel toe; adjust as needed.
7. Center steering wheel.
8. Check toe-out-on-turns (turning radius); determine necessary action.

9. Check SAI (steering axis inclination) and included angle; determine necessary action.
10. Check and adjust rear wheel toe.
11. Check rear wheel thrust angle; determine necessary action.
12. Check for front wheel setback; determine necessary action.
13. Check front cradle (subframe) alignment; determine necessary action.
14. Differentiate between steering and suspension concerns using principals of steering geometry (caster, camber, toe, etc).

Module 7. Wheel and Tire Diagnosis and Repair

1. Diagnose tire wear patterns; determine necessary action.
2. Inspect tires; check and adjust air pressure.
3. Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.
4. Rotate tires according to manufacturer's recommendations.
5. Measure wheel, tire, axle, and hub runout; determine necessary action.
6. Diagnose tire pull (lead) problem; determine necessary action.
7. Balance wheel and tire assembly (static and dynamic).
8. Dismount, inspect, repair, and remount tire on wheel.
9. Reinstall wheel; torque lug nuts.
10. Inspect and repair tire.

COURSE REQUIREMENTS

Students are responsible for attaining competencies through completion of the following course requirements:

ATTENDANCE:

Students will be bound by the policies stated in the York Technical College Student Handbook. Students must attend 80% of the hours assigned the class for a semester to receive credit for the course. In case a student does miss a class, the student is responsible for obtaining the material that was covered during the absence. If a student is aware that a class will be missed, then the student should notify the instructor at the earliest possible date. Students with unexcused absences during tests will be allowed to make up tests at the discretion of the instructor. The student has the burden to be sure that some arrangement has been made with the instructor for taking a make-up test.

ACADEMIC HONESTY

York Technical College adheres to the South Carolina Tech Student code, approved by the State Board for Technical and Comprehensive Education on March 13, 1974(revised last April, 25 1984). Copies of this code are available in the Library and from Student Services. Any student involved in cheating or any other academic dishonesty will be given a grade of zero and will be subject to further disciplinary action. See the student handbook section "Student Life" subheading "Student Conduct" for further details.

PARTICIPATION IN CLASS

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.

EVALUATION STRATEGIES / GRADING

The grading scale will be as follows:

Grade Points	
A	90-100
B	80-89
C	70-79
D	60-69
F	00-59

Evaluation Method

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.

Final grades will be determined as follows:

Module 1	Tests	8.3%
Module 1	Lab	8.3%
Module 2	Tests	8.3%
Module 2	Lab	8.3%
Module 3	Tests	8.3%
Module 3	Lab	8.3%
Module 4	Tests	8.3%
Module 4	Lab	8.3%
Module 5	Tests	8.3%
Module 5	Lab	8.3%
Module 6	Tests	8.3%
Module 6	Lab	8.3%
Total Grade		100%

ENTRY LEVEL SKILLS

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

PREREQUISITES - None

CO-REQUISITES - RDG 100