



### AST 125 Automotive Steering and Suspension

#### Course Information

Division	ASET
Contact Hours	105
Theory	15
Lab Hours	90
Total Credits	4

Co requisites – AST 101

#### Course Description

This course focuses on steering mechanisms and suspension components. Macpherson strut, parallelogram and additional industry standard designs will be discussed. Proper methods of inspection, diagnosis, repair and alignment of both front and rear steering and suspension components will be covered.

This course is a required core course for students pursuing a (n) certificate or an *AAS in Automotive Technologies*

#### Program Outcomes Addressed by this Course:

Upon successful completion of this course, students should be able to meet the program outcomes listed below:

- A. Demonstrate the correct method of utilizing automotive service tools and equipment
- B. Identify all related system diagnostic/repair information within automotive service information
- C. Employ safe and professional work habits while conducting typical automotive service procedures.
- D. Explain how the various systems of an automobile work
- E. Demonstrate correct service procedures in the various automotive systems
- F. Test and diagnose the proper operation of the various automotive systems

#### Course Outcomes

In order to evidence success in this course, the students will be able to:

##### 1. Understand and demonstrate wheel and tire operation, diagnosis and Repair

- a) 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.
- b) Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.
- c) Rotate tires according to manufacturer's recommendations.
- d) Measure wheel, tire, axle flange, and hub runout; determine necessary action.
- e) Diagnose tire pull problems; determine necessary action.
- f) Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).
- g) Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.
- h) Inspect tire and wheel assembly for air loss; perform necessary action.
- i) Repair tire using internal patch.



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- j) Identify and test tire pressure monitoring system (indirect and direct) for operation; calibrate system; verify operation of instrument panel lamps.
- k) Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system.
- l) Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
- m) Identify and interpret suspension and steering system concerns; determine necessary action.

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

#### 2. Understand and demonstrate steering system operation, diagnosis and repair

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

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

#### 3. Understand and demonstrate suspension system operation, diagnosis, and repair

- a) Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action.



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

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

#### 4. Understand and demonstrate related suspension and steering service procedures

- a) Inspect, remove, and replace shock absorbers; inspect mounts and bushings.
- b) Remove, inspect, and service or replace front and rear wheel bearings.
- c) Describe the function of the power steering pressure switch.

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

#### 5. Understand and demonstrate wheel alignment diagnosis, adjustment, and repair

- a) Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action.
- b) Perform prealignment inspection and measure vehicle ride height; perform necessary action.
- c) 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.
- d) Check toe-out-on-turns (turning radius); determine necessary action.
- e) Check SAI (steering axis inclination) and included angle; determine necessary action.
- f) Check rear wheel thrust angle; determine necessary action.
- g) Check for front wheel setback; determine necessary action.
- h) Check front and/or rear cradle (sub frame) alignment; determine necessary action.
- i) Reset steering angle sensor

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

Date Updated:  
By: Ross Oskui