South Central College

AST 1513 Suspension/Steering/Alignment

Course Outcome Summary

Course Information

Description	This course covers front and rear suspension systems, wheel balance, and steering systems and components. Students will be required to perform a front and rear wheel alignment. (Prerequisite: Admission into the Automotive Service program and AST1112 or instructor approval)
Total Credits	3
Total Hours	64

Types of Instruction

Instruction Type	Credits/Hours
Lecture	2/32
Lab	1/32

Pre/Corequisites

Admission into the Automotive Service program

Institutional Core Competencies

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. Exhibit professionalism

Learning Objectives

Identify safety procedure
Perform safety procedures

2. Assess steering components and operation

Learning Objectives

Lubricate steering components
Inspect manual or power steering fluid level, condition, flush, fill and bleed system
Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps
Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper

3. Assess suspension components and operation

Learning Objectives

Lube suspension components
Diagnose McPherson strut suspension system noises / body sway / ride height problems
Diagnose short / long arm suspension system noises / body sway / ride height problems

4. Identify and interpret steering system concerns; determine necessary action

Learning Objectives

Describe power pump operation, pressure hose, return hose, and idle compensation switch
Test power steering pump / volume and pressure
Diagnose power steering fluid leakage; determine necessary action
Remove, reinstall power steering pump, press fit pulley, reseal pump, check pulley/belt alignment
Remove, inspect, replace, and adjust power steering belts, hoses, and fittings
Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise; determine necessary action
Diagnose power steering gear (non-rack and pinion) binding, turning effort, hard steering, looseness, and noise
Test and diagnose components of electronically-controlled steering systems using a scan tool; determine necessary action
Inspect electric power-assisted steering
Inspect rack and pinion / mounts / bushings and brackets
Inspect and replace rack and pinion inner tie rods and boots
Replace rack and pinion steering gear

5. Identify and interpret supension system concerns; determine necessary action

Learning Objectives

Inspect, remove, and/or replace shock absorbers; inspect mounts and bushings
Remove, inspect, and install strut cartridge or assembly, spring, insulators, and upper strut bearing
Replace ball joints on McPherson strut suspension
Remove, inspect, and install upper and lower ball joints (with or without wear indicators)
Remove, inspect, and install steering knuckle assemblies
Remove, inspect, and install strut rods (compression, tension) and bushings
Inspect, remove, and/or replace front / rear stabilizer bar (sway bar) bushings, brackets, and links
Remove, inspect, install, and adjust torsion bars; inspect mounts
Remove, inspect and install short long arm suspension coil springs and spring insulators
Remove, inspect, and install upper and lower control arms, bushings, shafts, and rebound bumpers
Remove / inspect and replace leaf springs / insulators / shackles / mounts / bushings, and brackets
Inspect, remove, and/or replace track bar, strut rods / radius arms, and related mounts and bushings

6. Rotate tires / inspect / adjust tire pressure / reinstall and torque lug nuts

Learning Objectives

Repair tire following vehicle manufacturer approved procedure
Diagnose wheel / tire vibration, shimmy, and noise, perform tire / wheel balance, both static and dynamic
Measure wheel / tire / axle and hub runout
Inspect tire condition; identify tire wear patterns; check for correct tire size, application (load and speed ratings), and air pressure as listed on the tire information placard / label
Rotate tires according to manufacturer's recommendations
Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor
Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system
Identify indirect and direct tire pressure monitoring system (TPMS); calibrate system; verify operation of instrument panel lamps

7. Diagnose wheel bearing noise / vibration / replace sealed wheel bearing

Learning Objectives

Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings.
Replace wheel studs
Diagnose sealed wheel bearing

8. Service steering column components

Learning Objectives

Diagnose steering column noises, looseness, and binding concerns (including tilt / telescoping mechanisms); determine needed action
Disable and enable Supplemental Restraint Systems (SRS): verify indicator lamp operation
Inspect and or replace steering wheel, lock cylinder, column components, time SRS clock spring
Service steering shaft universal joints, flex coupling, and collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action

9. Identify steering geometrical angles

Learning Objectives

Perform prealignment inspection and measure/adjust ride height; perform necessary action
Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine needed action
Diagnose tire pull problem; determine necessary action
Prepare vehicle for wheel alignment on the alignment machine; perform four wheel alignment by checking and adjusting front and rear wheel caster, camber, and toe as required; center steering wheel
Check rear wheel thrust angle; determine necessary action
Check Steering Axis Inclination (SAI) and included angle / determine repairs
Check front cradle (subframe) alignment; determine necessary action
Explain damaged strut diagnosis
Check toe-out-on-turns (turning radius); determine necessary action
Check front wheel setback; determine necessary action
Reset steering angle sensor

SCC Accessibility Statement

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