Business & Engineering Technologies Division **REVISED 2012**

Curricula in Which Course Is Taught: Automotive Analysis & Repair

Course Number and Title: **AUT 266 Automotive Alignment, Suspension & Steering**

Course Credits 4 **Lecture 2 Hours/Week** **Laboratory 6 Hours/Week**

I. Course Description:

Introduces automotive suspension and steering systems with diagnosis, wheel alignment and balance, and power steering systems.

II. Relationship of the Course to Curriculum Objectives:

Students will:

I. demonstrate technical competencies and skills in automotive suspension and steering systems
II. demonstrate punctuality and reliability acceptable to the automotive repair industry
III. demonstrate an understanding of the economic costs of automotive vehicle repair
IV. use safety equipment and procedures required for the operations being performed
V. read and interpret technical information required for projects and assignments
IV. demonstrate and maintain a clean, orderly, safe, and attractive work place and maintain a personal appearance that will enhance that work place

III. Requirements:

Textbook:Automotive Technology (Principles, Daignosis, & Service), latest edition, written by Halderman/Mitchell, Prentice Hall Publisher

IV. Course Objectives-ASE task list:

Identify and interpret suspension and steering concerns; determine action
Research applicable vehicle service information
Locate and interpret vehicle and major component identification numbers
Disable and enable supplemental restraint system
Remove and replace steering wheel; center/time clock spring
Diagnose steering column noises, looseness and binding concerns
Diagnose non-rack and pinion power steering concerns
Diagnose rack and pinion power steering concerns
Inspect steering shaft u-joint, flexible coupling, collapsible column, lock mechanism and steering wheel concerns; determine action
Adjust manual or power non-rack and pinion worm bearing preload and sector lash
Remove and replace manual or power rack and pinion steering gear; inspect mounting
Inspect and replace manual or power rack and pinion steering gear inner tie-rod ends and boots
Inspect power steering fluid levels and condition
Flush, fill, and bleed power steering system
Diagnose power steering fluid leakage; determine action
Remove, inspect, replace and adjust power steering belt
Remove and reinstall power steering pump
Remove and reinstall power steering pump pulley; check pulley/belt alignment
Inspect power steering hoses and fittings
Inspect and replace pitman arm, centerlink, tie rod end/sleeves/clamps
Test and diagnose components of electronically controlled steering systems using scan tool
Diagnose short and long arm suspension system concerns
Diagnose strut suspension system concerns
Remove, inspect and reinstall upper and lower control arm bushings, shafts, bumpers
Remove, inspect and reinstall strut rod bushings
Remove, inspect and reinstall upper and lower ball joints
Remove, inspect and reinstall steering knuckle assemblies
Remove, inspect and reinstall short and long arm suspension coil springs
Remove, inspect, reinstall and adjust torsion bar suspensions
Remove, inspect and reinstall stabilizer bar bushings, brackets and links
Remove, inspect and reinstall strut cartridge or assembly, spring, etc.
Lubricate suspension and steering systems

Remove, inspect and reinstall rear coil springs
Remove, inspect and reinstall rear transverse links, control arms, bushings, etc.
Remove, inspect and reinstall leaf spring assemblies
Remove, inspect and reinstall rear strut cartridge or assembly, spring, etc.
Inspect, remove, and replace shock absorbers
Remove, inspect, and service or replace front or rear wheel bearings
Test and diagnose components of electronically controlled suspensions using a scan tool
Differentiate between steering and suspension concerns using the principles of steering geometry
Diagnose vehicle vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine action
Perform alignment inspection; determine action
Measure vehicle ride height; determine action
Check and adjust front and rear wheel camber; perform action
Check and adjust caster; perform action
Check and adjust front wheel toe
Center steering wheel
Check toe-out-on-turns; determine action
Check SAI and included angle; determine action
Check and adjust rear toe
Check and adjust rear wheel thrust angle
Check front wheel setback; determine action
Check front cradle alignment; determine action
Diagnose tire wear patterns; determine action
Inspect tires; check and adjust air pressure
Diagnose wheel/tire vibration, shimmy and noise; determine action
Rotate tires according to manufacturer's specifications
Measure wheel, tire, axle, and hub run-out; determine action
Diagnose tire pull; determine action
Balance wheel and tire assembly
Dismount, inspect, repair and remount tire on wheel
Reinstall wheel; torque lug nuts
Inspect and repair tire

V. <u>Learner Outcomes</u>:

1. **identify parts found in automotive suspension systems**
2. **identify parts found in automotive steering systems**
3. **identify tire wear factors**
4. **diagnose tire wear problems**
5. **diagnose directional stability problems**
6. **diagnose suspension wear**
7. **diagnose power steering systems**
8. **diagnose wheel alignment factors**
9. **identify wheel alignment factors**

VI. Evaluation:

Evaluated by multiple choice, true/false or fill in the blank questions
by project work verified by the Instructor

10. **measure wheel alignment factors using Hunter D111 or 611**
11. **Adjust wheel alignment factors to specifications**
12. **remove and replace various steering and suspension parts**
13. **rotate and balance wheel and tire assemblies**
14. **inspect, test and replace power steering components**
15. **center steering wheel during a complete alignment**
16. **demonstrate knowledge of adjustments necessary to correct alignment**
17. **demonstrate knowledge of replacement of bent or worn parts to correct alignment**
18. **75% of students will be able to complete these assignments**

VI. The following General Education Objectives will be addressed in this course:

<u>X</u> Communications

__X__ **Learning Skills**

__X__ **Critical Thinking**

_____ **Interpersonal Skills and Human Relations**

__X__ **Computational and Computer Skills**

_____ **Understanding Culture and Society**

__X__ **Understanding Science and Technology**

_____ **Wellness**