

## **COURSE OUTLINE**

### **Suspension & Steering II**

#### **Course Description**

AT 206. Suspension & Steering II. 3 hours credit. Prerequisite AT 203 with C or better. This course will enable the student to comprehend and apply suspension system component operation, diagnosis and service procedures with a primary emphasis on alignment principles, diagnosis and service procedures. Students will also engage in vibration and noise diagnosis / correction procedures as part of the alignment process.

#### **Course Relevance**

This is the culminating course for the suspension and steering section. An understanding of the components and principles included in this section will empower the student with the ability to transfer the knowledge acquired here to any alignment situation. The suspension/ steering area of automotive repair is one of the “specialty” employment opportunities available to automotive technicians.

#### **Required Materials**

Halderman, JD. (2004). *AUTOMOTIVE steering suspension steering and alignment*. (3<sup>rd</sup> ed.). Upper Saddle River, New Jersey: Pearson Education Inc.

Supplemental Materials: Calculator and materials necessary to take notes, draw or trace diagrams and perform mathematical computations.

#### **Learning Outcomes**

The intention is for the student to be able to

1. Diagnose suspension system components
2. Service suspension system components in accordance to recommended procedures
3. Diagnose proper alignment needs and service vehicle accordingly
4. Diagnose and correct vibration and noise complaints

#### **Primary Learning PACT Skills that will be DEVELOPED and/or documented in this course**

Through the student’s involvement in this course, he/she will develop his/her ability in the following primary PACT skill areas:

1. Field-Related Technology
  - The student will demonstrate technological skills through the utilization of task specific technology in the service, repair and alignment of customer vehicles.

Secondary skills (developed but not documented):

Reading  
Critical Thinking

## Major Summative Assessment Task(s)

These learning outcomes and the primary Learning PACT skills will be demonstrated by

1. Completion of a final project involving the analysis of steering and suspension components and performing alignment procedures according to manufacturers' specifications.

## Course Content

- I. Themes – Key recurring concepts that run throughout this course:
  - A. Responsibility
  - B. Safety
  - C. Liability
- II. Issues – Key areas of conflict that must be understood in order to achieve the intended outcome:
  - A. Accuracy in diagnosis
  - B. Timeliness in repair
  - C. Transference of previously learned knowledge
- III. Concepts – Key concepts that must be understood to address the issues:
  - A. Geometric relationships
  - B. Angles and degrees
  - C. Measuring skills
  - D. Alignment Specific terminology
- IV. Skills/Competencies – Actions that are essential to achieve the course outcomes:
  - A. The student must comply with the personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment, handling, storage and disposal of chemicals in accordance with local, state, and federal safety and environmental regulations
  - B. Diagnose short/long arm suspension system noises, body sway, and uneven riding height problems; determine needed repairs
  - C. Diagnose Mac Pherson strut suspension noises, body sway, and uneven ride height problems; determine needed repairs
  - D. Remove, inspect, and replace upper and lower control arms, bushings, shafts and rebound bumpers
  - E. Remove, inspect, replace and adjust strut (compression/tension) rods and bushings
  - F. Remove, inspect, replace upper and lower ball joints on SLA suspension systems
  - G. Remove, inspect and replace steering knuckle assemblies
  - H. Remove, inspect, replace and adjust suspension system torsion bars, inspect mounts
  - I. Remove, inspect and replace stabilizer bar bushings, brackets and links
  - J. Remove, inspect and replace ball joints on Mac Pherson strut suspensions
  - K. Remove, inspect and replace Mac Pherson strut cartridge or assembly, strut coil spring, insulators, and upper strut bearing mount
  - L. Lubricate steering and suspension systems
  - M. Remove, inspect and replace (rear) coil springs and spring insulators

- N. Remove, inspect, and replace transverse link, control arms, bushings and mounts
- O. Remove, inspect, and replace leaf spring insulators(silencers) , shackles, brackets bushings and mounts
- P. Inspect, remove and replace shock absorbers
- Q. Remove, inspect, service or replace front and rear wheel bearings
- R. Diagnose, inspect, adjust, repair or replace components of electronically controlled suspension systems
- S. Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer and steering return problems; determine needed repairs
- T. Measure vehicle ride height, determine needed repairs
- U. Check and adjust front and rear wheel camber, determine needed repairs
- V. Check and adjust caster, determine needed repairs
- W. Check and adjust front wheel toe; correct as needed
- X. Center steering wheel
- Y. Check toe out on turns (Ackerman) (turning radius); determine needed repairs
- Z. Check SAI and included angle; determine needed repairs
- AA. Check and adjust rear wheel toe
- BB. Check rear wheel thrust angle; determine needed repairs
- CC. Check front wheel set-back; determine needed repairs
- DD. Check front cradle(sub frame) alignment; determine needed repairs

### **Learning Units**

- I. Drive axle shafts and C.V. joints
- II. Drive axle and C.V. joint service
- III. Wheel alignment principles
- IV. Alignment diagnosis and service
- V. Vibration and noise diagnosis and correction

### **Learning Activities**

Learning activities will be geared toward achieving the intended course outcomes through lecture, group projects, trainers, presentations (individual and group), textbook reading assignments and hands on assignments within the lab.

### **Grade Determination**

The student will be graded on assessment tasks, examinations, written and lab assignments and other methods of evaluation at the discretion of the instructor. Grades will reflect a compilation of lab and written assignments. Promptness, adherence to safety rules, team work, clean-up and class participation will be the traits evaluated in the lab.