



Wayne County Community College District

COURSE SYLLABUS

AUT 204 Suspension And Steering II

CREDIT HOURS: 2.00

CONTACT HOURS: 45.00

COURSE DESCRIPTION:

This course is a continuation course of Steering and Suspension I. This course is designed to provide the student with the knowledge and skills to inspect, diagnose and perform repair procedures on automotive steering and suspension systems, as well as introduction to basic inspection and diagnosing of steering and suspension problems will be applied in this course. Identification of special tools used on these systems will also be explained. In addition, ASE principles for certification will be introduced to the student.

PRE-REQUISITE: AUT 114, AUT 115, AUT 116, AUT 117, and AUT 121

EXPECTED COMPETENCIES:

Upon completion of this course the student should be familiar with:

Shop Safety

For every task in Steering and Suspension, the following safety requirements must be strictly enforced: Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

- **Identify protective clothing and equipment and their proper use; proper shop behavior; principles of fire safety; and federal regulations concerning hazardous material and shop safety.**

Objective

- Describe how to select individual personal protective clothing and equipment.
- Identify the dangers of improper behavior in the shop.
- Identify the importance of proper grooming and hygiene.
- Identify the classes of fires and the types of fire extinguishers.
- Identify the use of a fire blanket.
- Identify general fire emergency procedures.
- Identify the Occupational Safety and Health Administration (OSHA) regulations.
- Identify the Environmental Protection Agency (EPA) regulations.
- Identify the safe use of fire protection equipment
- Identify the safe use of shop equipment following Environmental Protection Agency (EPA) and Occupational Safety and Health Act (OSHA) regulations



Wayne County Community College District

COURSE SYLLABUS

-
- **Identify and explain the safe and proper use of chemicals**

Objective

- Identify the types and uses of solvents.
- Identify the types and uses of soaps and cleaning solutions.
- Identify the types and uses of oils.
- Identify the types and uses of greases.
- Identify the types and uses of specialty additives.
- Identify the types and uses of specialty chemicals.
- Describe the five general rules for using automotive chemicals.
- Complete the assignment sheet on lubricants.
- Complete the assignment sheet on lubricants.
- Identify gasses and the hazards they present.
- Identify the hazards of asbestos dust.

Steering Systems Diagnosis and Repair

- **Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action. P-2**

Objective

- Identify the procedures for diagnosing steering column problems.
- Identify the procedure for diagnosing electronically controlled steering systems.

- **Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and fluid leakage concerns; determine necessary action. P-3**

Objective

- Identify the procedures for checking and adjusting manual steering fluid levels.
- Identify procedures for inspecting the condition and level of fluids in conventional power steering and power rack-and-pinion steering systems.
- Identify procedures for bleeding a power steering system.
- Identify the procedures for diagnosing leaks in power steering pumps.
- Identify the procedures for diagnosing leaks on a conventional power steering gear.
- Identify the procedures for diagnosing fluid leaks in power rack-and-pinion systems.
- Identify the procedures for diagnosing leaks in power steering hoses.
- Identify the equipment needed for testing power steering systems.
- Identify the procedures for hooking up the power steering testing equipment.
- Identify the procedures for checking power steering systems pressure.
- Identify the procedures for servicing power steering hoses.

- **Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and fluid leakage concerns; determine necessary action. P-3**

Objective

- Identify the procedures for removing and installing a power steering pump.
- Identify the procedures for servicing power steering hoses.
- Identify the procedures for servicing a power steering pump.



Wayne County Community College District

COURSE SYLLABUS

- **Test and diagnose components of electronically controlled steering systems using a scan tool; determine necessary action. P-3**

Objective

- Identify the procedure for diagnosing electronically controlled steering systems.
- Demonstrate the ability to:
 - A. Test and diagnose components of electronically controlled steering systems using a scan tool.

Wheel Alignment Diagnosis, Adjustment, and Repair

- **Check rear wheel thrust angle; determine necessary action. P-2**

Objective

- Identify the various wheel alignment angles and settings.
- Identify the various types for wheel alignment equipment.
- Identify the procedures for making pre-alignment checks.
- Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
- Identify the procedures for rear-wheel alignment.
- Identify the procedures for four-wheel alignment.
- Demonstrate the ability to:
 - A. Perform a general steering and suspension systems diagnosis.
 - B. Measure and correct rear-wheel alignment.
 - C. Diagnose and correct steering and suspension concerns using principles of steering geometry.

- **Check for front wheel setback; determine necessary action. P-2**

Objective

- Identify the causes of vibration at highway speeds.
- Identify the characteristics and causes of wheel shimmy.
- Identify the characteristics of rough or damaged wheel bearings.
- Identify the characteristics and causes of wander.
- Identify the characteristics and causes of lateral pull.
- Identify the characteristics and causes of hard steering.
- Identify the characteristics and causes of poor steering return.
- Identify the procedures for diagnosing steering, suspension, and wheel alignment problems during a road test.
- Identify the characteristics of wheel alignment.
- Identify the various wheel alignment angles and settings.
- Identify the various types for wheel alignment equipment.
- Identify the procedures for making pre-alignment checks.
- Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
- Identify the procedures for adjusting front-wheel camber.
- Identify the procedures for adjusting front-wheel caster.
- Identify the procedures for adjusting front-wheel toe.
- Demonstrate the ability to:
 - A. Perform a general steering and suspension systems diagnosis.
 - B. Diagnose wheel or tire vibrations, shimmy, and noise.
 - C. Measure and correct front-wheel alignment.
 - D. Diagnose and correct steering and suspension concerns using principles of steering geometry.



Wayne County Community College District

COURSE SYLLABUS

- **Check front cradle (subframe) alignment; determine necessary action. P-3**

Objective

- Identify the causes of vibration at highway speeds.
- Identify the characteristics and causes of wheel shimmy.
- Identify the characteristics of rough or damaged wheel bearings.
- Identify the characteristics and causes of wander.
- Identify the characteristics and causes of lateral pull.
- Identify the characteristics and causes of hard steering.
- Identify the characteristics and causes of poor steering return.
- Identify the procedures for diagnosing steering, suspension, and wheel alignment problems during a road test.
- Identify the characteristics of wheel alignment.
- Identify the various wheel alignment angles and settings.
- Identify the various types for wheel alignment equipment.
- Identify the procedures for making pre-alignment checks.
- Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
- Identify the procedures for adjusting front-wheel camber.
- Identify the procedures for adjusting front-wheel caster.
- Identify the procedures for adjusting front-wheel toe.
- Demonstrate the ability to:
 - A. Perform a general steering and suspension systems diagnosis.
 - B. Diagnose wheel or tire vibrations, shimmy, and noise.
 - C. Measure and correct front-wheel alignment.
 - D. Diagnose and correct steering and suspension concerns using principles of steering geometry.

- **Differentiate between steering and suspension concerns using principles of steering geometry (caster, camber, toe, etc). P-1**

Objective

- Identify the procedures for making pre-alignment checks.
- Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
- Identify the various wheel alignment angles and settings.
- Demonstrate the ability to:
 - A. Perform a general steering and suspension systems diagnosis.
 - B. Diagnose wheel or tire vibrations, shimmy, and noise.
 - C. Diagnose and correct steering and suspension concerns using principles of steering geometry.



Wayne County Community College District

COURSE SYLLABUS

- **Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action. P-1**

Objective

- Identify the causes of vibration at highway speeds.
- Identify the characteristics and causes of wheel shimmy.
- Identify the characteristics of rough or damaged wheel bearings.
- Identify the characteristics and causes of wander.
- Identify the characteristics and causes of lateral pull.
- Identify the characteristics and causes of hard steering.
- Identify the characteristics and causes of poor steering return.
- Identify the procedures for diagnosing steering, suspension, and wheel alignment problems during a road test.
- Demonstrate the ability to:
 - A. Perform a general steering and suspension systems diagnosis.
 - B. Diagnose wheel or tire vibrations, shimmy, and noise.
 - C. Measure and correct front-wheel alignment.
 - D. Measure and correct rear-wheel alignment.
 - E. Diagnose and correct steering and suspension concerns using principles of steering geometry.

- **Perform prealignment inspection; perform necessary action. P-1**

Objective

- Identify the characteristics of wheel alignment.
- Identify the various wheel alignment angles and settings.
- Demonstrate the ability to:
 - A. Perform a general steering and suspension systems diagnosis.
 - B. Diagnose wheel or tire vibrations, shimmy, and noise.

- **Measure vehicle riding height; determine necessary action. P-1**

Objective

- Identify the procedures for determining vehicle ride height.
- Identify the various types for wheel alignment equipment.
- Identify the procedures for making pre-alignment checks.
- Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
- Identify the procedures for adjusting front-wheel camber.
- Identify the procedures for adjusting front-wheel caster.
- Identify the procedures for adjusting front-wheel toe.
- Identify the procedures for rear-wheel alignment.
- Identify the procedures for four-wheel alignment.
- Demonstrate the ability to:
 - A. Measure and correct front-wheel alignment.
 - B. Measure and correct rear-wheel alignment.
 - C. Diagnose and correct steering and suspension concerns using principles of steering geometry.



Wayne County Community College District

COURSE SYLLABUS

-
- **Check and adjust front and rear wheel camber; perform necessary action. P-1**
Objective
 - Identify the various types for wheel alignment equipment.
 - Identify the procedures for making pre-alignment checks.
 - Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
 - Identify the procedures for adjusting front-wheel camber.
 - Identify the procedures for adjusting front-wheel caster.
 - Identify the procedures for adjusting front-wheel toe.
 - Identify the procedures for rear-wheel alignment.
 - Identify the procedures for four-wheel alignment.
 - Demonstrate the ability to:
 - A. Measure and correct front-wheel alignment.
 - B. Measure and correct rear-wheel alignment.
 - C. Diagnose and correct steering and suspension concerns using principles of steering geometry.

 - **Check and adjust caster; perform necessary action. P-1**
Objective
 - Identify the various types for wheel alignment equipment.
 - Identify the procedures for making pre-alignment checks.
 - Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
 - Identify the procedures for adjusting front-wheel camber.
 - Identify the procedures for adjusting front-wheel caster.
 - Identify the procedures for adjusting front-wheel toe.
 - Identify the procedures for rear-wheel alignment.
 - Identify the procedures for four-wheel alignment.
 - Demonstrate the ability to:
 - A. Measure and correct front-wheel alignment.
 - B. Measure and correct rear-wheel alignment.
 - C. Diagnose and correct steering and suspension concerns using principles of steering geometry.

 - **Check and adjust front wheel toe; adjust as needed. P-1**
Objective
 - Identify the various types for wheel alignment equipment.
 - Identify the procedures for making pre-alignment checks.
 - Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
 - Identify the procedures for adjusting front-wheel camber.
 - Identify the procedures for adjusting front-wheel caster.
 - Identify the procedures for adjusting front-wheel toe.
 - Identify the procedures for rear-wheel alignment.
 - Identify the procedures for four-wheel alignment.
 - Demonstrate the ability to:
 - A. Measure and correct front-wheel alignment.
 - B. Measure and correct rear-wheel alignment.
 - C. Diagnose and correct steering and suspension concerns using principles of steering geometry.



Wayne County Community College District

COURSE SYLLABUS

- **Center steering wheel. P-1**

Objective

- Identify the various types for wheel alignment equipment.
- Identify the procedures for making pre-alignment checks.
- Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
- Identify the procedures for adjusting front-wheel camber.
- Identify the procedures for adjusting front-wheel caster.
- Identify the procedures for adjusting front-wheel toe.
- Identify the procedures for rear-wheel alignment.
- Identify the procedures for four-wheel alignment.
- Demonstrate the ability to:
 - A. Measure and correct front-wheel alignment.
 - B. Measure and correct rear-wheel alignment.
 - C. Diagnose and correct steering and suspension concerns using principles of steering geometry.

- **Check toe-out-on-turns (turning radius); determine necessary action. P-2**

Objective

- Identify the various types for wheel alignment equipment.
- Identify the procedures for making pre-alignment checks.
- Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
- Identify the procedures for adjusting front-wheel camber.
- Identify the procedures for adjusting front-wheel caster.
- Identify the procedures for adjusting front-wheel toe.
- Identify the procedures for rear-wheel alignment.
- Identify the procedures for four-wheel alignment.
- Demonstrate the ability to:
 - A. Measure and correct front-wheel alignment.
 - B. Measure and correct rear-wheel alignment.
 - C. Diagnose and correct steering and suspension concerns using principles of steering geometry.

- **Check SAI (steering axis inclination) and included angle; determine necessary action. P-2**

Objective

- Identify the various types for wheel alignment equipment.
- Identify the procedures for making pre-alignment checks.
- Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
- Identify the procedures for adjusting front-wheel camber.
- Identify the procedures for adjusting front-wheel caster.
- Identify the procedures for adjusting front-wheel toe.
- Identify the procedures for rear-wheel alignment.
- Identify the procedures for four-wheel alignment.
- Demonstrate the ability to:
 - A. Measure and correct front-wheel alignment.
 - B. Measure and correct rear-wheel alignment.
 - C. Diagnose and correct steering and suspension concerns using principles of steering geometry.



Wayne County Community College District

COURSE SYLLABUS

- **Check and adjust rear wheel toe. P-2**

Objective

- Identify the various types for wheel alignment equipment.
- Identify the procedures for making pre-alignment checks.
- Identify how the interrelationship of wheel alignment angles affects the wheel alignment procedure.
- Identify the procedures for adjusting front-wheel camber.
- Identify the procedures for adjusting front-wheel caster.
- Identify the procedures for adjusting front-wheel toe.
- Identify the procedures for rear-wheel alignment.
- Identify the procedures for four-wheel alignment.
- Demonstrate the ability to:
 - A. Measure and correct front-wheel alignment.
 - B. Measure and correct rear-wheel alignment.
 - C. Diagnose and correct steering and suspension concerns using principles of steering geometry.

ASSESSMENT METHODS:

Student performance may be assessed by examination, quizzes, case studies, oral conversation, group discussion, oral presentations. The instructor reserves the option to employ one or more of these assessment methods during the course.

GRADING SCALE:

90%-100% = A

80%-89.9%= B

70%-79.9%= C

60%-69.9%= D

<60% = E