



# Broward Community College

## Course Outline

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**LAST REVIEW:** 2005-2006

**NEXT REVIEW:** 2010-2011

**STATUS:** A

**COURSE TITLE:** Steering and Suspension Systems

**COMMON COURSE NUMBER:** AER2498C

**CREDIT HOURS:** 4

**CONTACT HOUR BREAKDOWN**

*(per 16 week term)*

**CLOCK HOURS:**

Lecture: 48      Lab: 48

*(Voc. Course ONLY)*

Clinic:                      Other: 89

**PREREQUISITE(S):**

**COREQUISITE(S):**

**PRE/COREQUISITE(S):**

<p><b>COURSE DESCRIPTION:</b> A course designed to teach the principles of steering systems, suspension systems, and wheel alignment and to provide practical experience in repairing automobile suspension and steering systems, aligning front ends, and balancing tires. Topics include wheel balancing, suspension systems, suspension geometry, wheel alignment, standard steering gears, power steering systems and frames. Special emphasis will be given to safety procedures and the specific tools and instruments to be used.</p>
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**UNIT TITLES:**

1. Steering System Principles
2. Steering System Maintenance and Repair
3. Suspension System Principles
4. Suspension System Repair
5. Wheel, Tire, and Wheel Bearing Principles
6. Wheel, Tire, and Wheel Bearing Repair

## **I. Course Overview:**

Upon successful completion of this course, the students should be able to discuss the principles of steering systems, suspension systems, and wheel alignment and repair suspension and steering systems, align front ends, and balance tires.

## **II. Units:**

### **Unit 1. Steering System Principles**

#### General Outcome:

- 1.0 The students should be able to discuss the operating principles and construction of steering systems.

#### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 1.1 Discuss the operation and construction of both manual and power rack and pinion steering systems.
- 1.2 Identify each component and its relation to adjacent components.
- 1.3 Discuss the operation and construction of both manual and power re-circulating ball steering systems.
- 1.4 Describe each component and its relation to adjacent components.
- 1.5 Define the following concepts of front end geometry: (a) Camber, (b) Steering-axis inclination, (c) Caster, (d) Toe, (e) Toe-out on turns (Ackermann effect), (f) Included angle, (g) Thrust-angle, (h) Scrub-angle

## Unit 2. Steering System Maintenance and Repair

### General Outcome:

2.0 The students should be able to discuss the maintenance requirements and repair procedures of steering systems.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 2.1 Perform all steering system inspection and routine maintenance procedures.
- 2.2 Identify the following causes of steering system failure and poor performance: (a) Noise, (b) Excessive play, (c) Shimmy, (d) Instability, (e) Hard Steering, (f) Pulling
- 2.3 Remove, rebuild, adjust, and reinstall steering gears, power steering pumps, steering columns, and steering linkage as appropriate.

### Unit 3. Suspension System Principles

#### General Outcome:

3.0 The students should be able to discuss the operating principles and construction of suspension systems.

#### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 3.1 Describe the construction and operation of the major types of front and rear suspension systems.
- 3.2 Locate the following on a vehicle: (a) Spring type (i.e. coil spring, torsion bar, leaf spring, or air) (b) Steering arm, (c) Steering knuckle, (d) Control arm, (e) Variable effort steering components, (f) Stabilizer bar, (g) Ball joint, (h) Shackle, (i) Bushing, (j) McPhearson strut, (k) Shock absorber
- 3.3 Describe the components and operation of a variable assist power steering system.

## Unit 4. Suspension System Repair

### General Outcome:

4.0 The students should be able to discuss the maintenance requirements and repair procedures of suspension systems.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 4.1 Perform all suspension system inspection and routine maintenance procedures.
- 4.2 Identify the cause of suspension system failure and poor performance.
- 4.3 Remove, replace, and realign springs, struts, shock absorbers, stabilizers, torsion bars, ball joints, control arms, and bushings, and perform 2 and 4 wheel alignment, as appropriate.

## Unit 5. Wheel, Tire, and Wheel Bearing Principles

### General Outcome:

5.0 The students should be able to discuss the operating principles and construction of wheels, tires, and wheel bearings.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

5.1 Describe the construction and operation of automobile wheels, wheel bearings, and tires.

5.2 Locate the following on a vehicle: (a) Stamped steel wheels, (b) Alloy wheels, (c) Bias-ply tires, (d) Belted-bias tires, (e) Radial tires, (f) Inner and outer bearings

5.3 Explain their construction.

5.4 Define the following terms: (a) Radial run-out, (b) Lateral run-out, (c) Radial tire lead, (d) Tire load rating, (e) Roller bearing wear, (f) tire force variation

## Unit 6. Wheel, Tire, and Wheel Bearing Repair

### General Outcome:

6.0 The students should be able to discuss maintenance requirements and repair procedures of wheels, tires, and wheel bearings.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 6.1 Perform inspection and routine maintenance of wheels, tires, and wheel bearings.
- 6.2 Identify the cause of wheel, tire, and bearing failure; vibration; excessive wear; and poor performance.
- 6.3 Remove, repair, replace, adjust, and balance faulty wheels, tires, and wheel bearings, as appropriate.