

**SOUTHEAST COMMUNITY COLLEGE
TRANSPORTATION OCCUPATIONS
AUTO COLLISION REPAIR TECHNOLOGY
COURSE SYLLABUS
January 11, 2024**

I. CATALOG DESCRIPTION

Course Number: AUTB2451
Course Title: Automotive Mechanical Systems Theory
Prerequisite(s): AUTB 1254, AUTB 1256

Catalog Description: Evolution and theory of front and rear suspension design. Transaxle and four-wheel alignment and its relationship to collision damaged vehicles. Introduction to drum, disc, manual, and power-assisted braking systems. Theory and operation of the anti-lock brake systems. Operation of the automotive cooling system and theory of air conditioning systems and the repair of damage components after a collision. Refrigerant recovery and recycling are covered.

Credit Hour: 3.0
Classroom Hours: 38
Lab Hours: 23
Total Contact Hours: 61

II. COURSE OBJECTIVES: *Course will:*

- A. Teach the students the theory and principles of steering gears, steering components, wheels and tires components before or after a collision
- B. Teach the students the theory and principles of 2- and 4-wheel alignment equipment.
- C. Teach the students the theory and principles of tire pressure monitor systems.
- D. Teach the importance of repairing the brake system correctly.
- E. Teach the components contained in a drum brake assembly and how to recondition the drum brake assembly safely. Including wheel bearing assemblies, inspecting for damage, and repacking the assembly with new grease safely.
- F. Teach the components in a brake hydraulic, and anti-lock brake system.
- G. Teach the importance of correct handling procedures of automotive refrigerant systems to prevent injury. Various components in the air conditioning system and repair or replace damaged components after a collision.
- H. Teach how to recover, evacuate, recharge, and leak test the air conditioning system. Pressure test a cooling system and radiator pressure cap, test the thermostat and heater core for proper operation and test coolant freezing point.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

A. STUDENT LEARNING OUTCOMES: *The student will be able to:*

- 1. Identify the different suspension systems and steering systems and be able to explain repair and replacement procedures including alignment procedures.
- 2. Identify the steering and suspension system parts, and be able to check for wear and damage to those components.
Demonstrate the proper use of the equipment utilized during a typical repair, and the alignment process.
- 3. Identify the various parts in a brake system including wheel bearing assemblies, drums, calipers, brake lines, and master cylinder.

4. Identify the various components in an anti-lock brake system and repair or replace damaged components after a collision safely.
5. Understand how to safely recover, evacuate, recharge, and leak test the air conditioning system. Pressure test a cooling system and radiator pressure cap, test the thermostat and heater core for proper operation and test coolant freezing point.

B. GENERAL EDUCATION LEARNING OUTCOMES:

GELO #3: Critical Thinking & Problem Solving

Outcomes:

1. Collect, identify, interpret and analyze data.
2. Synthesize information to arrive at reasoned solutions to problems.
3. Evaluate ideas presented in writing, medial, speech, or artistic presentations.
4. Evaluate the validity of arguments, alternatives, data, outcomes, and/or impacts of actions.
5. Acquire and integrate knowledge and construct relationships across disciplines.

IV. CONTENT/TOPICAL OUTLINE

- A. Tires
- B. Suspension Components
- C. Steering Components
- D. Alignment Angles
- E. Drive Axles
- F. Drive Shaft
- G. How Brakes Stop the Vehicle
- H. Power Brakes
- I. Diagnosing Poor Brake Performance
- J. Anti-Lock Brake Systems
- K. Current Automotive Refrigerants
- L. Air Conditioning System
- M. Charging the Air Conditioning System
- N. Engine Cooling System
- O. Shop Safety

V. INSTRUCTIONAL MATERIALS

Required Text(s):

Auto Body Repair Technology 6th Edition Text. Copyright 2015
ISBN-13: 978-1133702856, ISBN-10: 1133702856

I-CAR Technical Reparability Service Information Site
Equipment Manufacturers, Replacement Parts Manufacturers,
and Instructor Produced Hand-outs

Other Resources:

Computer/multimedia projector
Videos/DVD
Snap-On Alignment Mock-Up Computerized Measuring System
Tram Bar

Self-centering gauges
Damaged steering components
Worn steering components
Damaged suspension components
Damaged steering components

Student Required Material:

Notebook
Pen or pencil

Outside Reading/Research Required:

Chapters will be assigned according to the class schedule.
Research on state-of-the-art equipment or procedures as
assigned by the instructor.

VI. METHODS OF PRESENTATION / INSTRUCTION

- A. Methods of presentation typically include a combination of the following:

1. Lecture
2. Small and large group discussion
3. Video presentation
4. Transparencies
5. Demonstrations
6. Project boards
7. Flip charts
8. Handouts
9. Observations
10. Assigned lab projects
11. Field trips

VII. METHODS OF EVALUATION

A. Methods of evaluation typically include a combination of the following:

1. Notebook (if required)
2. Quizzes
3. Tests
4. Lab grades
5. Attendance/Class conduct

Letter grades will be based on the SCC Standard Grade Scale Policy. **Note:** See course information document for specific details on how the course grades will be calculated.

VIII. SPECIFIC COURSE REQUIREMENTS

A. Student must:

1. Complete all tests, projects, assignments, and notebook (if required).
2. Earn a final grade of 60% or higher.

B. Attendance:

1. Students must follow the Attendance Policy as stated in the college student handbook and the Auto Collision Repair Technology Attendance Policy.

C. Program shop safety rules will be followed.

D. Please see the course information document for any additional safety rules established by the instructor.