

Automotive Suspension & Steering Systems

Class

AUMT 1316

Diagnosis and repair of automotive suspension and steering systems, including electronically controlled systems. Includes component repair, alignment procedures, and tire and wheel service. May be taught manufacturer-specific.

Course Length

16, 8, and 5 week term offerings

Format for Delivery

F-2-F, Hybrid, and Online

Course Learning Objectives

Students who successfully complete this course will be able to utilize safety procedures; explain the operations of suspension and steering systems; diagnose and repair system components, including electronically controlled systems; perform 4-wheel alignment procedures; and perform tire service and repair.

Learning outcomes are linked to SCANS requirements. Specific SCANS requirements are linked to the class schedule.

1. The student will demonstrate the ability to diagnose and repair front and rear suspension systems. The student will be able to
 1. Perform diagnostic procedures on strut and shock absorber components and control arm, ball joint, spring, and torsion bar components (1a, 1b, 2a, 2c, 2d, 2e);
 2. Perform repairs on strut and shock absorber components and control arm, ball joint, spring, and torsion bar components (1a, 1b, 2a, 2c, 2d, 2e).
2. The student will demonstrate an understanding of the operation and construction of suspension systems. The student will be able to
 1. Explain the purpose, operation, and components of different types of front and rear suspension systems (1a, 1b, 2c, 2d).
3. The student will demonstrate an understanding of the operation of different types of steering systems. The student will be able to
 1. Explain the purpose, operation, and components of a power steering rack and pinion (1a, 1b, 2c, 2d);
 2. Explain the purpose, operation, and components of a power steering gear (1a, 1b, 2c, 2d);
 3. Explain the purpose, operation, and components of a power steering pump (1a, 1b, 2c, 2d);
 4. Explain the purpose, operation, and components of various types of steering linkages (1a, 1b, 2c, 2d).
4. The student will demonstrate an understanding of different types of steering systems. The student will be able to
 1. Perform diagnostic procedures on the power steering rack and pinion components, gear components, pumps, and different types of steering linkages (1a, 1b, 2a, 2c, 2d, 2e);
 2. Perform repairs on the power steering rack and pinion components, gear components, pumps, and various types of steering linkages (1a, 1b, 2a, 2c, 2d, 2e).
5. The student will demonstrate an understanding of alignment and suspension geometry. The student will be able to
 1. Explain the purpose of steering axis inclination (SAI), caster, camber, and toe (1a, 1b, 2c, 2d);
 2. Explain the geometric centerline, scrub radius, wheel offset, thrust line, setback, and ride height (1a, 1b, 2c, 2d).
6. The student will perform a wheel alignment. The student will be able to
 1. Perform a four-wheel alignment (1a, 1b, 2a, 2c, 2d, 2e);
 2. Perform a two-wheel alignment (1a, 1b, 2a, 2c, 2d, 2e);
7. The student will demonstrate an understanding of the purpose and construction of automobile tires and rims. The student will be able to
 1. Identify tire construction, size and ratings (1a, 1b, 2c, 2d);
 2. Identify various rim construction and size (1a, 1b, 2c, 2d).
8. The student will be able to diagnose and repair tire concerns. The student will be able to
 1. Identify tire wear patterns (1a, 1b, 2a, 2c, 2d, 2e);

2. Measure tire and rim run out (1a, 1b, 2a, 2c, 2d, 2e);
3. Perform diagnostic procedures on tire inflation problems and tire pressure monitoring systems (1a, 1b, 2a, 2c, 2d, 2e);
4. Perform repairs on tire inflation problems and tire pressure monitoring systems (1a, 1b, 2a, 2c, 2d, 2e);
5. Demonstrate proper procedures to mount, balance, and rotate tires (1a, 1b, 2a, 2c, 2d, 2e).
9. The student will demonstrate an understanding of personal and laboratory safety. The student will be able to
 1. Explain the practices necessary to ensure a minimal chance of personal injury or property damage (1b, 1c, 2a, 2e);
 2. Practice proper safety procedures in the classroom and laboratory (1b, 1c, 2a, 2e).
10. The student will utilize computerized software used in the automotive repair industry. The student will be able to
 1. Write repair orders (1a, 1b, 2a, 2c, 2d);
 2. Use Mitchell-On-Demand to identify repair procedures, locate technical service bulletins (TSBs), and determine repair specifications (1a, 1b, 2a, 2c, 2d, 2e).

Required Textbooks

Today's Technician: Basic Automotive Service and Systems, Classroom Manual and Shop Manual 6th edition

By Chris Hadfield, John Witthauer

E-book included with Cengage Unlimited subscription, required for all AUMT courses.

SUPPLIES AND EQUIPMENT: Tool list to be provided by the instructor.

COPYRIGHT POLICY: Unless a student has obtained permission from the copyright holder, it is a violation of Copyright Law to print or photocopy chapters from a textbook that the student did not purchase. If the course requires the use of an electronic textbook, a student must look for a statement that allows for photocopying and/or printing of the eTextbook.

Evaluation Standards

Periodic tests, both objective and skill-based, allow the student to demonstrate their level of achievement in each competency.

Student success is measured by assessment techniques aligned to course goals and learning outcomes. A variety of techniques may be used, including but not limited to objective exams, written reports, performance charts, portfolios, oral presentations or demonstrations, and group projects. Individual faculty members are responsible for designing evaluation instruments to measure student mastery of course goals and learning outcomes and for indicating the nature of such instruments in the instructor's class requirements.

GRADING REQUIREMENTS:

30% Labsheet assignment completion

25% Skills test including final skills test

20% Written tests, including a final exam

10% Quizzes, including pop quizzes

5% Assignments, including e-learning modules, review questions, etc.

5% Participation in class and lab (affected by absences)

5% Properly following safety procedures and proper clean up of lab area

Written Tests: Acceptable written evaluations shall be completed with a minimum score of; 80% or higher. Safety-related written tests may require a higher score for mastery, and curriculum-specified best practices will be followed.

Performance Evaluations: Acceptable and safe completion of performance evaluations will be determined by the instructor according to accepted industry standards and the specified criteria. Performance evaluations meeting minimum industry standards will earn a grade of 70% (C or Satisfactory). Those exceeding “minimum” acceptance standards may earn higher grades subject to the instructors’ approval. Students not meeting minimum acceptance standards must repeat each unacceptable performance evaluation until minimum skills are achieved. Students unable to meet minimum acceptance standards may be assigned an “F” grade for any incomplete competencies. However, all specified competencies **MUST** be completed to receive credit for this course, and any incomplete competencies may result in an “F” in the course.

Supplemental evaluations may include safe practices, student participation, quizzes, time management, workplace skills, and other instructor-specified content.

Drop Date

If you intend to withdraw from the course or resign from the college, you must initiate the action by logging into Coyote Connect. The instructor will not withdraw you automatically.

Absences

ATTENDANCE POLICY: It is the student’s responsibility to maintain regular contact with instructors. Class attendance is the responsibility of the student. All students must be officially enrolled in any course that they attend. It is expected that students attend all classes and be on time. If an absence occurs, it is the responsibility of the student to make up examinations, obtain lecture notes, and otherwise compensate for what may have been missed. Students who stop attending class and do not officially drop, withdraw, or resign from the college may receive a grade of “F” for all coursework missed. Absences affect performance in this course and do not reflect well on participation. No student may substitute the attendance of another student.

Students should frequently check Canvas (Learning Management System) for notifications and updates to the course. Students are expected to use the online resources provided by WC to:

1. Track course assignments and progress
2. Discuss topics and issues with fellow students
3. Turn in assignments, quizzes, and tests
4. Check for any updates, changes or alterations to the course
5. Access all course materials to include presentations, assignments, quizzes, and tests.

Instructional Methods

Lecture, demonstrations, lab exercises.

Disabilities

ADA Statement:

Any student with a documented disability (e.g. learning, psychiatric, vision, hearing, etc.) may contact the Office on the Weatherford College Weatherford Campus to request reasonable accommodations. *Phone:* 817-598-6350
Office Location: Office Number 118 in the Student Services Building, upper floor. *Physical Address:* Weatherford College 225 College Park Drive Weatherford, TX.

Academic Integrity

Academic Integrity is fundamental to the educational mission of Weatherford College, and the College expects its students to maintain high standards of personal and scholarly conduct. Academic dishonesty of any kind will not be tolerated. Academic dishonesty includes, but is not limited to, cheating on an examination or other academic work, plagiarism, collusion, and the abuse of resource materials including unauthorized use of Generative AI. Departments

may adopt discipline specific guidelines on Generative AI usage approved by the instructional dean. Any student who is demonstrated to have engaged in any of these activities will be subject to immediate disciplinary action in accordance with institutional procedures.

Program Learning Outcomes

Upon completion of the program, graduates will be able to:

- Perform tasks to diagnose and repair components of electrical/electronic systems, and heating, ventilation and air conditioning systems.
- Perform tasks to diagnose and repair automotive engine and power train systems.
- Perform tasks to diagnose and repair components of automotive suspension and steering systems.
- Perform tasks to diagnose and repair components of hydraulic and anti-lock brake systems.

SCANS

The Secretary's Commission on Achieving Necessary Skills (SCANS) identified competencies in the areas of Resources, Interpersonal, Information, Systems, and Technology; and foundation skills in the areas of Basic Skills and Personal Qualities. This course is part of a program in which each of these competencies and skills are integrated. For the application of specific SCANS competencies and skills in this course.

SCANS Competencies and Foundations			
Suspension and Steering			
RESOURCES			
C1 Allocates Time			
C2 Allocates Money			
C3 Allocates Material & Facility Resources	X		
C4 Allocates Human Resources			
INFORMATION			
C5 Acquires & Evaluates Information	X		
C6 Organizes & Maintains Information	X		
C7 Interprets & Communicates Information	X		
C8 Uses Computers to Process Information			
INTERPERSONAL			
C9 Participates as a Member of a Team	X		
C10 Teaches Others	X		
C11 Serves Clients Customers			
C12 Exercises Leadership	X		
C13 Negotiates to Arrive at a Decision			
C14 Works with Cultural Diversity	X		
SYSTEMS			
C15 Understands Systems	X		
C16 Monitors & Corrects Performance	X		
C17 Improves & Designs Systems			

TECHNOLOGY			
C18 Selects Technology	x		
C19 Applies Technology	x		
C20 Maintains & Troubleshoots Technology	x		
BASIC SKILLS			
F1 Reading	X		
F2 Writing			
F3 Arithmetic	X		
F4 Mathematics			
F5 Listening	X		
F6 Speaking	X		
THINKING SKILLS			
F7 Creative Thinking	X		
F8 Decision Making	X		
F9 Problem Solving	X		
F10 Seeing Things in the Mind's Eye			
F11 Knowing How to Learn	X		
F12 Reasoning	X		
PERSONAL QUALITIES			
F13 Responsibility	X		
F14 Self-Esteem	X		
F15 Social			
F16 Self-Management	X		
F17 Integrity/Honesty	X		
	Resources: Identifies, organizes, plans, and allocates resources.		
	C1 Time: Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.		
	C2 Money: Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.		
	C3 Materials and Facilities: Acquires, stores, allocates, and uses materials or space efficiently.		
	C4 Human Resources: Assesses skills and distributes work accordingly, evaluates performance and provides feedback.		
	Information: Acquires and uses information.		
	C5 Acquires and evaluates information.		
	C6 Organizes and maintains information.		
	C7 Interprets and communicates information.		
	C8 Uses computers to process information.		
	Interpersonal: Works with others.		
	C9 Participates as a member of a team: Contributes to group effort.		
	C10 Teaches others new skills.		
	C11 Serves Clients/Customers: Works to satisfy customers' expectations.		
	C12 Exercises Leadership: Communicates ideas to justify position, persuades and convinces others, and responsibly challenges existing procedures and policies.		
	C13 Negotiates: Works toward agreements involving the exchange of resources; resolves divergent interests.		
	C14 Works With Diversity: Works well with men and women from diverse backgrounds.		
	Systems: Understands complex interrelationships.		

	C15 Understands Systems: Knows how social, organizational, and technological systems work and operate effectively with them.
	C16 Monitors and Corrects Performance: Distinguishes trends, predicts impacts on system operations, diagnoses system performance, and corrects malfunctions.
	C17 Improves or Designs Systems: Suggests modifications to existing systems and develops new or alternative systems to improve performance.
	Technology: Works with a variety of technologies.
	C18 Selects Technology: Chooses procedures, tools, or equipment, including computers and related technologies.
	C19 Applies Technology to Task: Understands overall intent and proper procedures for setup and operation of equipment.
	C20 Maintains and Troubleshoots Equipment: Prevents, identifies, or solves problems with equipment, including computers and other technologies.
	Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens, and speaks.
	F1 Reading: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
	F2 Writing: Communicates thoughts, ideas, information, and messages in writing; creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
	F3 Arithmetic: Performs basic computations; uses basic numerical concepts such as whole numbers, etc.
	F4 Mathematics: Approaches practical problems by choosing appropriately from a variety of mathematical techniques.
	F5 Listening: Receives, attends to, interprets, and responds to verbal messages and other cues.
	F6 Speaking: Organizes ideas and communicates orally.
	Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons.
	F7 Creative Thinking: Generates new ideas.
	F8 Decision Making: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses the best alternative.
	F9 Problem Solving: Recognizes problems and devises and implements plan of action.
	F10 Seeing Things in the Mind's Eye: Organizes and processes symbols, pictures, graphs, objects, and other information.
	F11 Knowing How to Learn: Uses efficient learning techniques to acquire and apply new knowledge and skills.
	F12 Reasoning: Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.
	Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, integrity, and honesty.
	F13 Responsibility: Exerts a high level of effort and perseveres toward goal attainment.
	F14 Self-Esteem: Believes in own self-worth and maintains a positive view of self.
	F15 Sociability: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.
	F16 Self-Management: Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.
	F17 Integrity/Honesty: Chooses ethical courses of action.