Automotive Electronics

Topics address electrical principles, semiconductor and integrated circuits, digital fundamentals, microcomputer systems, and electrical test equipment as applied to automotive technology. May be taught manufacturer specific.

Course Learning Objectives

Explain the difference between conductors, insulators and semiconductors; measure electrical values in series and parallel circuits; study the use of electronic components to include resistors, diodes, transistors, and capacitors; interpret the use of sensors, microcomputers and outputs; and implement test equipment to diagnose vehicle faults related to electrical and electronic systems.

Learning outcomes are linked to SCANS requirements. Specific SCANS requirements are linked to the class schedule. The student will be able to:

1. Explain electronic fundamentals (1a, 1b, 2c, 2d, 2e);
2. Read electronic wiring diagrams (1a, 1b, 2c, 2d, 2e);
3. Measure electronic circuits (1a, 1b, 2c, 2d, 2e);
4. Diagnose and correct electronic system problems (1a, 1b, 2c, 2d, 2e).
5. Diagnose and correct sensor system problems (1a, 1b, 2c, 2d, 2e);
6. Perform bench test, diagnose relay operation (1a, 1b, 2c, 2d, 2e);
7. Diagnose and correct BCM controlled system problems (1a, 1b, 2c, 2d, 2e);
8. Diagnose and correct ABS controlled system problems (1a, 1b, 2c, 2d, 2e);
9. Diagnose and correct Air Bag system problems (1a, 1b, 2c, 2d, 2e).
10. Demonstrate the proper use of a diagnostic scan tool (1a, 1b, 2c, 2d, 2e);

Evaluation Standards

Periodic test, both objective and skill based, which 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.

A student shall retain all rights to work created as part of instruction or using College District technology resources.

Instructional Methods

Lecture, demonstrations

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.
- Use basic skills, thinking skills, resources, interpersonal skills, information skills, and technology.

SCANS

The Secretary's Commission on Achieving Necessary Skills (SCANS) identified competencies in the area 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 application of specific SCANS competencies and skills in this course, see Addendum B.

SCANS Competencies and Foundations		
AUTOMOTIVE ELECTRONICS		
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, responsibly challenges existing procedures and policies.
	C13 Negotiates: Works toward agreements involving 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 operates effectively with them.
	C16 Monitors and Corrects Performance: Distinguishes trends, predicts impacts on system operations, diagnoses system's 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 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 towards 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.

Workforce Education Course Manual (WECM) designated course content approved by the Texas Higher Education Coordinating Board (THECB) Austin, Texas. The THECB is an accredited agency for Texas community colleges.