

COURSE SYLLABUS

AUMT 1407 (4:2:8)

AUTOMOTIVE ELECTRICAL SYSTEMS

Automotive Service Technology

Industrial Technology Department

Technical Education Division

Levelland Campus

SOUTH PLAINS COLLEGE

SCANS COMPETENCIES

- C-1 TIME--Selects goal--relevant activities, ranks them, allocates time, and prepares and follows schedules.
- C-2 MONEY--Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives
- C-3 MATERIALS & FACILITIES--Acquires, stores, allocates, and uses materials or space efficiently.
- C-4 HUMAN RESOURCES--Assesses skills and distributes work accordingly, evaluates performances and provides feedback.
- INFORMATION--Acquires and Uses Information
- C-5 Acquires and evaluates information.
- C-6 Organizes and maintains information.
- C-7 Interprets and communicates information.
- C-8 Uses computers to Process information.
- INTERPERSONAL--Works With Others
- C-9 Participates as members of a team and contributes to group effort.
- C-10 Teaches others new skills.
- C-11 Serves clients/customers--works to satisfy customer's expectations.
- C-12 Exercises leadership--communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
- C-13 Negotiates--Works toward agreements involving exchanges of resources resolves divergent interests.
- C-14 Works with Diversity--Works well with men and women from diverse backgrounds.
- SYSTEMS--Understands Complex Interrelationships
- C-15 Understands Systems--Knows how social, organizational, and technological systems work and operates effectively with them
- C-16 Monitors and Correct Performance--Distinguishes trends, predicts impacts on system operations, diagnoses systems' performance and corrects malfunctions.
- C-17 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
- C-18 Selects Technology--Chooses procedures, tools, or equipment including computers and related technologies.
- C-19 Applies Technology to Task--Understands overall intent and proper procedures for setup and operation of equipment.
- C-20 Maintains and Troubleshoots Equipment--Prevents, identifies, or solves problems with equipment, including computers and other technologies.

FOUNDATION SKILLS

- BASIC SKILLS--Reads, writes, performs arithmetic and mathematical operations, listens and speaks
- F-1 Reading--locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
- F-2 Writing--Communicates thoughts, ideas, information and messages in writing, and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
- F-3 Arithmetic--Performs basic computations; uses basic numerical concepts such as whole numbers, etc.
- F-4 Mathematics--Approaches practical problems by choosing appropriately from a variety of mathematical techniques.
- F-5 Listening--Receives, attends to, interprets, and responds to verbal messages and other cues.
- F-6 Speaking--Organizes ideas and communicates orally.
- THINKING SKILLS--Thinks creatively, makes decisions, solves problems, visualizes, and knows how to learn and reason
- F-7 Creative Thinking--Generates new ideas.
- F-8 Decision-Making--Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
- F-9 Problem Solving--Recognizes problems and devises and implements plan of action.
- F-10 Seeing Things in the Mind's Eye--Organizes and processes symbols, pictures, graphs, objects, and other information.
- F-11 Knowing How to Learn--Uses efficient learning techniques to acquire and apply new knowledge and skills.
- F-12 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
- F-13 Responsibility--Exerts a high level of effort and preservers towards goal attainment.
- F-14 Self-Esteem--Believes in own self-worth and maintains a positive view of self.
- F-15 Sociability--Demonstrates understanding, friendliness, adaptability, empathy, and politeness in-group settings.
- F-16 Self-Management--Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.
- F-17 Integrity/Honesty--Chooses ethical courses of action.

LEVELLAND CAMPUS

COURSE SYLLABUS

COURSE TITLE: AUMT 1410 AUTOMOTIVE BRAKE SYSTEMS (4:2:6)

INSTRUCTOR: Gary Ham

OFFICE LOCATION AND PHONE/E-MAIL: Auto/Diesel Building Office # 1
806-716-2296 gham@southplainscollege.edu

OFFICE HOURS: 7:30 to 8:00 AM and 2:30 to 4:00 PM.

SOUTH PLAINS COLLEGE IMPROVES EACH STUDENT'S LIFE

I. GENERAL COURSE INFORMATION:

- A. Course Description: This is an overview of automotive electrical systems. The course includes topics in operational theory, testing, diagnosis, and repair of batteries, charging and starting systems, and electrical accessories. Emphasis is placed on the utilization of electrical schematic diagrams and service manuals. Safety is emphasized throughout the course. Elements of the course may be taught manufacturer specific.
- B. Course Learning Outcomes: Utilizing appropriate safety procedures, the student will interpret wiring schematics and symbols; explain electrical principles; and explain the theory and principles of battery starting, charging systems, and automotive electrical accessories; demonstrate diagnosis and repair of battery starting, charging systems, and automotive electrical accessories; and demonstrate proper use of electrical test equipment.
- C. Course Competencies: Upon completion of this course the student must demonstrate the following competencies:
 - 1. Demonstrate safety responsibilities. Display proper use of tools and equipment. Demonstrate the ability to properly run an engine in a shop. Explain the proper use of a fire extinguisher.
 - 2. Test and diagnose protection devices, switches, relays, resistors, rheostats, potentiometers, and diodes. Demonstrate the use of voltmeters, ohmmeters, amp-meters, and test lights.
 - 3. Demonstrate troubleshooting techniques. Perform a variety of copper wire repairs. Repair a variety of wiring harness connectors. Read wiring diagrams to determine operations and faults of a circuit.
 - 4. Demonstrate battery safety precautions. Demonstrate variety of battery test associated with capacity, charge, drains, leaks, terminal testing, and boosting procedures.
 - 5. Diagnose a variety of lighting system circuits for operation.
 - 6. Diagnose speedometers, tachometers, gauges, sending units, visible and audible warning light circuits.

7. Perform a systematic diagnosis of a starting system. Explain starting system theory of operations. Remove, disassemble, clean, inspect, repair, reassemble, and test a starter motor.
8. Perform a systematic diagnosis of a charging system. Explain charging system theory of operations. Remove, disassemble, clean, inspect, repair, reassemble, and test an A\C generator.
9. Use Strategy Based Diagnostics to diagnose and repair systems including horns, windshield wiper motors, windshield washers, blower motors, defoggers, power windows, power locks, cruise controls, automatic seat belts, power seats, anti-theft alarms, keyless entry, ABS, and a variety of other systems.
10. Describe service precautions associated with servicing control modules. Operate and perform test using computer diagnostic scan tools. Properly service computers and prom chips.
11. Perform self-diagnostic test on electronic controlled systems. Test and diagnose speedometers, odometers, speed sensors, high and low gauge readings.

- D. ACADEMIC INTEGRITY: (See current college catalog for policy)
- E. SCANS and Foundation Skills. C-1 through C-20 and F-1 through F-17 See back of cover page
- F. Verification of Workplace Competencies: All graduating students in the Automotive Service Technology program will have a comprehensive, exit review exam administered in their last semester in order to comply with the state requirement for a “capstone learning experience”

II. SPECIFIC COURSE/INSTRUCTOR REQUIREMENTS:

- A. Textbook and Other Materials:
Today’s Technician \ Automotive Electricity and Electronics, 4th Edition, By Barry Hollembeak. Students are required to possess a basic tool set for the program by the 12th class day.
- B. Attendance Policy: Whenever absences become excessive and, in the instructor's opinion, minimum course objectives cannot be met due to absences, the student should be withdrawn from the course. In addition, an instructor is required to notify the Office of Student Services when the student has missed every class day during any 14 consecutive calendar-day period, excluding holidays.

When an unavoidable reason for class absence arises, such as illness, an official trip authorized by the college or an official activity, the instructor may permit the student to make up work missed. It is the student’s responsibility to complete work missed within a reasonable period of time as determined by the instructor.

Students are officially enrolled in all courses in which they pay tuition and fees at the time of registration. Should a student, for any reason, delay in reporting to class after official enrollment, absences will be attributed to the student from the first meeting of the class.

A student who does not attend a class and does not officially withdraw from that course by the 12th class day in a regular semester or by the 4th class day

in a summer session should be administratively withdrawn from that course and receive a grade of “X” or “F” as determined by the instructor. Instructors are responsible by clearly stating their administrative drop policy in the course syllabus, and it is the student’s responsibility to be aware of that policy.

Regular attendance is required. Roll will be checked at the beginning of each class. Absences may affect the final grade as follows:

- fourth absence (4th), final grade may be lowered 5 points
- fifth absence (5th), final grade may be lowered an additional 5 points (10 points from initial grade).
- sixth absence (6th), final grade may be lowered an additional 5 points (15 points from initial grade).

If you are absent for 90 minutes or more, you will be considered absent for that day. Three (3) tardies are considered to equal 1 absence. On the 6th absence, you may be automatically dropped from the course. If the excessive absence occurs after the official drop date at the end of the semester, a grade of "F" will be issued.

- C. Assignment Policy: Class assignments and/or homework may be given at the instructor's discretion. Homework and other assignments are due on time. Late work will not be accepted. If you are late for an exam, you will not be allowed to take the exam and will receive a grade of zero on that exam. Students are expected to complete all assignments. When assigned to a lab competency, the student is expected to stay with the project until completion.
- D. Grading Policy/Procedure and/or methods of evaluation: There are three categories taken into consideration when computing the final semester grades. The percentages below will be calculated based on points given for completion of the following objectives:

1. Class Participation / Homework: 25 %
2. Skills objectives: 50%
3. Knowledge objectives: 25%

There are four levels of attainable grades in the Automotive Service Technology program. This grading policy follows industry standards used in ASE certification testing. The levels are:

- A (90 and above)
- B (80 to 89)
- C (70 to 79)
- F (69 and below)

- E. Special Requirements: The student must pass a series of comprehensive exit exams related to the main competencies covered in the automotive courses. The exams shall be administered during the last semester of the program.

- F Behavior: The student is expected to follow all of the rules and regulations of the program, provided to you the first week of class, and posted in the classroom and lab area. Students who are deemed by their instructor to be disruptive, disrespectful, and/or otherwise detrimental to the class may be dropped from all automotive courses in which you are enrolled for the semester.

HAZARDOUS MATERIALS

Students will come in contact with chemicals and other materials, which come under the "HAZARDOUS MATERIALS" classification as defined by Title 83, Article 5182b of the Hazard Communication Act. Material Safety Data Sheets (MSDS) information will be posted outside of office number 1. Warning signs are posted throughout the Auto/Diesel building and all appropriate personal protective equipment will be provided, which the student must use. Safety information will be given and demonstrated in class before safety quizzes and test.

III. COURSE OUTLINE:

Safety

- A. Safety responsibilities
- B. Use of tools and equipment
- C. How to properly run an engine in a shop

Basic Theories

- A. Electricity defined
- B. Types of current
- C. Magnetism principles
- D. Theory of Induction
- E. Conductors, Semi-conductors, and Insulators

Electric Components

- A. Voltmeters, amp-meters, and ohmmeters
- B. Electrical components and circuits
- C. Electronic components and circuits

Wiring and Circuit Diagrams

- A. Automotive wiring
- B. Resistance factors of a conductor
- C. Determining the right gauge wire
- F. Wiring diagrams

Automotive Batteries

- A. Safety precautions
- B. Battery types
- C. Battery testing and failure

Direct Current Motors and the Starting System

- A. Motor principles
- B. Motor designs
- C. Component and operation of the starting system

Charging Systems

- A. Principles of operation
- B. AC generator circuits and design
- C. Component and operation of the charging system

Ignition Systems

- A. Ignitions Components
- B. Common DI Systems
- C. Computer-Controlled Ignition System Operation
- D. EI System Operation

Lighting Circuits

- A. Headlamp operation
- B. Interior and exterior lighting circuits and operations

Conventional Analog Instrumentation, Indicator Lights, and Warning Devices

- A. Speedometers
- B. Tachometers
- C. Gauge Sending Units

Electrical Accessories

- A. Power windows, locks, seats and mirrors
- B. Blower motor circuits
- C. Windshield wipers and pumps
- D. Electric defoggers

Introduction to the Body Computer

- A. Analog and digital principles
- B. Central Processing Units
- C. Sensor Inputs
- D. Outputs
- E. Multiplexing

Advanced Lighting Circuits and Electronic Instrumentation

- A. Automatic headlight dimming
- B. Time delay
- C. Illuminated entry
- D. Digital displays

Electronic Chassis Electronic Control Systems

- A. Principles of operation
- B. Computer-controlled systems
- C. Electronic temperature control systems, Cruise control systems, Restraint systems, Automatic seat belts, Air bags, Sunroofs, Anti-theft, Keyless entry, Heated windshields, Electronic shift, Speed sensitive steering, ABS, Traction control, and Electronic suspension systems

Passive Restraint Systems

- A. Passive Seat Belt System
- B. Air Bag System
- C. Side Impact Air Bags

IV. ACCOMMODATIONS:

1. See “Equal opportunity” statement in the South Plains College catalog.
2. Students with disabilities, including but not limited to physical, psychiatric or learning disabilities, who wish to request accommodations in this class, should notify the Special Services Office early in the semester, so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Special Services Coordinator. For more information, call or visit the Special Services Office in the Student Services Building, 894-9611 ext. 2529, 2530.
3. See “Special Services” statement in the South Plains College catalog.
4. *Diversity Statement:* In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.