

COURSE SYLLABUS

AUMT 2421-001

AUTOMOTIVE ELECTRICAL DIAGNOSIS AND REPAIR

Automotive Technology

Industrial Technology Department

Technical Education Division

Levelland Campus

SOUTH PLAINS COLLEGE

Fall 2023

LEVELLAND CAMPUS

COURSE SYLLABUS

COURSE TITLE: AUMT 2421 Automotive electrical diagnosis and repair

INSTRUCTOR: Shelton Foos

OFFICE LOCATION AND PHONE/E-MAIL: Auto/Diesel Building Office # 104 806-716-2756
sfoos@southplainscollege.edu

OFFICE HOURS: Monday and Wednesday 1-3, Friday 8-12

SOUTH PLAINS COLLEGE IMPROVES EACH STUDENT'S LIFE

I. GENERAL COURSE INFORMATION:

- A. Course Description: An overview of automotive electrical systems including topics in operational theory, testing, diagnosis, and repair of, charging and starting systems, and electrical accessories. Emphasis on electrical principles, schematic diagrams, and service manuals. May be taught manufacturer specific.
- B. Course Learning Outcomes: Utilize appropriate safety procedures; define basic electrical principles; interpret wiring schematics and symbols; explain operation of batteries, starting/charging systems, and automotive circuits; use test equipment; and perform basic electrical repairs
- 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 hybrid vehicle high voltage safety procedures.
 - 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. 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.
 - 8 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.

- 9 Describe service precautions associated with servicing control modules. Operate and perform test using computer diagnostic scan tools. Properly service computers and prom chips.
- 10 Perform self-diagnostic test on electronic controlled systems. Test and diagnose speedometers, odometers, speed sensors, high and low gauge readings.
- 11 Perform diagnostic tests and repair on hybrid vehicle systems including high voltage systems

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: **Textbook and Other Materials: *Revel Automotive Technology: Principles, Diagnosis, and Service, 6e* by James D. Halderman** Students are requested to possess a basic tool set for the program by the 12th class day.

B. Attendance Policy: Students are expected to attend all classes in order to be successful in a course. The student may be administratively withdrawn from the course when absences become excessive as defined in the course syllabus. 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 for which they pay tuition and fees at the time of registration. Should a student, for any reason, delay in reporting to a class after official enrollment, absences will be attributed to the student from the first class meeting.

Students who enroll in a course but have “Never Attended” by the official census date, as reported by the faculty member, will be administratively dropped by the Office of Admissions and Records. A student who does not meet the attendance requirements of a class as stated in the course syllabus and does not officially withdraw from that course by the official census date of the semester, may be administratively withdrawn from that course and receive a grade of “X” as determined by the instructor. Instructors are responsible for clearly stating their administrative drop policy in the course syllabus, and it is the student’s responsibility to be aware of that policy.

It is the student’s responsibility to verify administrative drops for excessive absences through MySPC using his or her student online account. If it is determined that a student is awarded financial aid for a class or classes in which the student never attended or participated, the financial aid award will be adjusted in accordance with the classes in which the student did attend/participate and the student will owe any balance resulting from the adjustment.

Absence for Military Service

In accordance with Texas Education Code Section 51.9111, a student is excused from attending classes or engaging in other required activities, including exams, if he or she is called to active military service of a reasonably brief duration. The maximum time for which the student may be excused has been defined by the Texas Higher Education Coordinating Board as “no more than 25 percent of the total number of class meetings or the contact hour equivalent (not including the final examination period) for the specific course or courses in which the student is currently enrolled at the beginning of the period of active military service.” The student will be allowed a reasonable time after the absence to complete assignments and take exams.

Religious Holy Days

In accordance with Texas Education Code Section 51.911, South Plains College will allow a student who is absent from class for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within seven (7) calendar days after the absence. Students are required to file a written notification of absence with each instructor within the first fifteen (15) days of the semester in which the absence will occur. Forms for this purpose are available in the Dean of Students Office along with instructions and procedures. "Religious holy days" means a holy day observed by a religion whose place of worship is exempt from property taxation under Texas Tax Code Section 11.20.

Pregnancy

In accordance with Title IX of the Education Amendments of 1972, in the event of pregnancy, termination of pregnancy or recovery from any of these conditions a student's absences shall be excused, as deemed necessary by the student's physician (Title IX.) The student should contact the SPC Title IX coordinator for further assistance.

Regular attendance is required. Roll will be checked at the beginning of each class period. If you miss 60 minutes or more of a class period, you will be considered absent for that day. 2 tardies are considered to equal 1 absence. When absences become excessive, and you have a failing grade average at the time of the excessive absence, you may be administratively dropped from the course and any concurrent courses, **without notice.** **Any combination of absences or tardies that equal 4 or more is considered excessive. There are no excused absences.** *Leaving class without notifying your instructor is considered an absence, regardless of the time you left.*

It is the student's responsibility to verify administrative drops for excessive absences through MySPC using his or her student online account. If it is determined that a student is awarded financial aid for a class or classes in which the student never attended or participated, the financial aid award will be adjusted in accordance with the classes in which the student did attend/participate and the student will owe any balance resulting from the adjustment.

- 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. Skills Objectives (lab work) 50%
 2. Knowledge objectives (written exams) 20%
 3. Class Participation 20%
 4. Homework 10%

Tutoring

Students who do not pass their first exam will be required to attend three hours of tutoring each week until they pass their next exam. This is a course requirement and will be

reflected in the course grade.

Clean-up will be part of skills objectives grade. You will be expected to maintain a clean and safe work area at all times. A complete lab area cleanup will be performed at the end of the semester. Attendance will be mandatory for cleanup in order to be admitted to final exams.

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. A separate document outlining Classroom and Lab Area rules is provided the first week of class. This document must be signed by each student before he/she is allowed in the lab.

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:

- Chapter 43 Oscilloscopes and Graphing Multimeters
- Chapter 46 Capacitance and Capacitors
- Chapter 47 Magnetism and Electromagnetism
- Chapter 48 Electronic Fundamentals
- Chapter 49 CAN and Network Communications
- Chapter 56 Lighting and Signaling Circuits
- Chapter 58 Safety, Comfort and Convenience
- Chapter 59 Immobilizer Circuits

- Chapter 60 Airbag and Pretensioner Circuits
- Chapter 61 Autonomous Vehicles
- Chapter 62 Audio System Operation and Diagnosis

Assignment due dates and times will be determined during the semester. It is the students' responsibility to keep track of all assignments and communications.

Students can find the Diversity Statement, Disabilities Statement, Non-Discrimination Statement, Title IX Pregnancy Accommodations Statement, and Campus Concealed Carry Statement here:

<https://www.southplainscollege.edu/syllabusstatements/>.

4.

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.

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.

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