

COURSE SYLLABUS

AUMT 2317 (3:1:8)

**AUTOMOTIVE ENGINE PERFORMANCE ANALYSIS I**

Automotive 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.

## COURSE SYLLABUS

COURSE TITLE: AUTOMOTIVE ENGINE PERFORMANCE ANALYSIS I  
AUMT 2317 (3:1:8)

INSTRUCTOR: Michael Reimer

OFFICE LOCATION AND PHONE/E-MAIL: Auto \ Diesel Building- office #202  
(806) 894-9611 ext. 2295 mreimer@southplainscollege.edu

OFFICE HOURS: To be announced the first week of class.

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### I. GENERAL COURSE INFORMATION:

#### **A.Course Description:**

This course is a study in the diagnosis and repair of emission systems, computerized engine performance systems, and advanced ignition and fuel systems, as well as proper use of advanced engine performance diagnostic equipment. This course may be taught manufacturer specific.

#### **B.Course Learning Outcomes:**

Utilizing appropriate safety procedures, the student will explain the operation, diagnosis, and repair of emission control systems; describe the operation, diagnosis, and repair of emission control performance systems and advanced ignition and fuel systems; and demonstrate proper use of advanced engine performance diagnostic equipment.

#### **C.Course Competencies:**

Upon completion of this course the student must demonstrate the following competencies:

1. Demonstrate personal knowledge of shop safety with the use of shop equipment and around shop hazards.
2. Demonstrate the ability to retrieve trouble codes and sensor information using technical equipment.
3. Demonstrate a working knowledge of various ignition systems and methods of testing.
4. Explain the different fuel pumps and fuel filters and their use in the system.
5. Demonstrate the ability to test, service and make repairs on throttle body, injection systems, and port fuel injection systems.
6. Demonstrate the ability to use engine analyzers.
7. Demonstrate the ability to diagnose and repair turbocharger systems.
8. The student must also be able to utilize allocated time prudently in the completion of the assigned task.

9. Forecast completion cost based on interpretation of customer complaints.
10. Demonstrate proper use of manuals and computer equipment to retrieve information on correct repair procedures to properly complete a task.
11. Accomplish as a group, a task requiring various skills and completion that must be completed in the most efficient manner.
12. Demonstrate the ability to serve industry, by listening to the customer explanation of what is happening with their vehicle and demonstrate the ability to use established methods to operate equipment.
13. Demonstrate correct and safe procedures, as well as a working knowledge of hybrid systems.

- B. **Academic Integrity:** See current college catalog for policy.
- C. **SCANS and Foundation Skills:** C-1 through C-20 and F-1 through F-17 See back of cover page
- D. **Verification of Workplace Competencies:** Capstone experience is offered as a comprehensive written, oral, or hands-on exit exam during the last course of the program.

## II. SPECIFIC COURSE/INSTRUCTOR REQUIREMENTS:

- A. **Textbook and Other Materials: Automotive Technology. Principles, Diagnosis, and Service.** 5th Edition. By James D. Halderman. Students are required to possess a basic tool set for the program by the 12th class day.
- B. **Attendance Policy:** Please refer to college catalog page 19.

**Regular attendance is required.** Roll will be checked at the beginning of each class period. If you miss 90 minutes or more of a class period, you will be considered absent for that day. Two (2) tardies are considered to equal 1 absence. On the 4<sup>th</sup> absence, 10 (Ten) points may be deducted from your final grade. On the 5<sup>th</sup> (fifth) absence another 10 (ten) points may be deducted from your final grade for a total of 20 points. On the 6<sup>th</sup> (sixth) absence another 10 (Ten) points may be deducted from your final grade for a total of 30 points and 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. Tardies and absences will be applied to all courses. Leaving class without notifying your instructor is considered an absence, regardless of the time you left.

- C. **Assignment Policy:** Class assignments and/or homework may be given at the instructor's discretion. Homework and other assignments are due at the beginning of class unless otherwise instructed. Late work will not be accepted. 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 assignments: 25 %
2. Skills objectives: 50%
3. Knowledge Objectives: 25%

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.  
**Safety Exam:** The student must pass a safety exam with a score of 100 to continue lab assignments per NATEF standard 6.8C.
- 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:

**SAFETY PRACTICES**

- A. Occupational safety and health act
- B. Shop hazards
- C. Safety in the automotive shop
- D. Shop safety equipment
- E. Hazardous waste disposal

**BASIC THEORIES**

- A. Review of basic electricity
- B. Review of electronics
- C. Newton's laws of motion
- D. Principles involving liquids and gases

**ELECTRICITY AND ELECTRONICS**

- A. Basic electricity
- B. Types of circuits
- C. Basics of electronics
- D. Hybrid Battery system

**IGNITION SYSTEMS**

- A. Basic Ignition system
- B. Ignition coil action
- C. Electronic Switching Systems
- D. Computer-Controlled ignition system operation

**DISTRIBUTOR AND ELECTONIC IGNITION**

- A. Distributor ignition systems
- B. DI Systems
- C. EI Systems
- D. Fast Start EI Systems

**INTAKE AND EXHAUST SYSTEMS**

- A. Importance of Intake and Exhaust systems
- B. Intake manifolds
- C. Turbochargers
- D. Intercoolers

**FUEL SYSTEMS**

- A. Basic Carburetor circuits
- B. Fuel Injection
- C. Fuel Delivery

**ELECTRONIC FUEL INJECTION**

- A. Input sensors
- B. Throttle Body Injection Systems
- C. Port Fuel Injection
- D. Sequential Fuel Injection
- E. Active Fuel Management (Hybrid)

**EMISSION CONTROL SYSTEMS**

- A. Pollutants
- B. Evaporative Emission Control Systems
- C. Intake Heat Control Systems

- D. Catalytic converters
- E. Air Injection systems

#### **HYBRID SYSTEMS**

- A. Safety and Disconnect Procedures
- B. Two-Mode Operation

#### **IV. ACCOMMODATIONS:**

Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability 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 Disability Services Office. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Reese Center (Building 8) & Lubbock Center 806-716-4675, or Plainview Center (Main Office) 806-716-4302 or 806-296-9611.

#### **Non-Discrimination Statement**

South Plains College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Vice President for Student Affairs, South Plains College -1401 College Avenue, Box 5, Levelland, TX 79336, 806-894-9611

1. See “Equal opportunity” statement in the South Plains College catalog.
2. See “Special Services” statement in the South Plains College catalog.
3. 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.

#### **Campus Concealed Carry syllabus statement:**

Campus Concealed Carry - Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in South Plains College buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and South Plains College policy, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the SPC policy at:

([http://www.southplainscollege.edu/human\\_resources/policy\\_procedure/hhc.php](http://www.southplainscollege.edu/human_resources/policy_procedure/hhc.php))

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all South Plains College campuses. Report violations to the College Police Department at 806-716-2396 or 9-1-1.

### **Covid-19**

It is the policy of South Plains College for the Fall 2020 semester that as a condition of on-campus enrollment, all students are required to engage in safe behaviors to avoid the spread of COVID-19 in the SPC community. Such behaviors specifically include the requirement that all students properly wear CDC-compliant face coverings while in SPC buildings including in classrooms, labs, hallways, and restrooms. Failure to comply with this policy may result in dismissal from the current class session. If the student refuses to leave the classroom or lab after being dismissed, the student may be referred to the Dean of Students on the Levelland campus or the Dean/Director of external centers for Student Code of Conduct Violation.