

COURSE SYLLABUS

AUMT 2417 (4:2:8)

ENGINE PERFORMANCE AND ANALYSIS I

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 preserves 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: ENGINE PERFORMANCE AND ANALYSIS I
AUMT 2417 (4:2:8)

INSTRUCTOR: Michael Reimer

OFFICE LOCATION AND PHONE/E-MAIL: Auto \ Diesel Building- office #4
(806) 894-9611 ext. 2295 mreimer@southplainscollege.edu

OFFICE HOURS: 7:30 to 8:00 AM and 1:00 to 2:00 PM MW
8:00 AM to 1:00 PM F

SOUTH PLAINS COLLEGE IMPROVES EACH STUDENT'S LIFE

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.

- 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:** Today's Technician "*Automotive Engine Performance*", by Ken Pickerell, 4th ed. 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 period and after lunch. Absences will 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. Tardies and absences will be applied to all courses.

- 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%

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.

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.

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

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

EMISSION CONTROL SYSTEMS

- A. Pollutants
- B. Evaporative Emission Control Systems
- C. Intake Heat Control Systems
- D. Catalytic converters
- E. Air Injection systems

IV. ACCOMMODATIONS:

1. See "Equal opportunity" statement in the South Plains College catalog at bottom of page 3.
2. See "Services for Students with Disabilities" statement in the South Plains College catalog in right-hand column of page 46.
3. See "Special Services" statement in the South Plains College catalog in right-hand column of page 46.