

COURSE SYLLABUS

AUMT 1445 (4:2:8)

HEATING AND AIR CONDITIONING

AUTOMOTIVE SERVICE TECHNOLOGY

INDUSTRIAL TECHNOLOGY

TECHNICAL DIVISION

LEVELAND 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: AUMT 1445 HEATING AND AIR CONDITIONING (4:2:8)

INSTRUCTOR: Gary Ham

OFFICE LOCATION Auto/Diesel Building Office # 1
AND PHONE/E-MAIL: 806-894-9611 ext# 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 course explores the theory of automotive air conditioning and heating systems. Emphasis is placed on the basic refrigeration cycle and the diagnosis and repair of system malfunctions. The course includes EPA guidelines for refrigerant handling and new refrigerant replacements. Elements of the course may be taught manufacturer specific.
B. Course Learning Outcomes: Utilize appropriate safety procedures; explain the operation of the basic refrigeration cycle; diagnose and repair HVAC systems; demonstrate proper procedures for handling refrigerant; and describe the operation of air conditioning and heating controls
C. Course Competencies: Upon completion of this course the student must demonstrate the following competencies:
1. Describe the flow of refrigerant through the modern automotive air condition system and the working parts.
2. Explain the effects of moisture in the air condition system.
3. Demonstrate proper methods of refrigeration recovery.
4. Demonstrate proper procedure of testing, evacuation and recharging of an air condition system.
5. Demonstrate a working knowledge of related parts of the air condition systems.
6. The student must also be able to utilize allocated time prudently in the completion of the assigned task.
7. Forecast completion cost based on interpretation of customer complaints.
8. Demonstrate proper use of manuals and equipment to properly complete a task.
9. Accomplish as a group, a task requiring various skills and completion. Must be effected in the most efficient manner.
10. 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.

- 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: “*Automotive Heating and Air Conditioning*” By Mark Schnubel, 4th Edition, Delmar Publishers
Each student is expected to have the basic tools in the shop each class day. Tool list can be found on the AST Web Page. The school will provide specialized tools.
- 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 and after lunch. Absences will affect the final grade as follows:

--fourth absence (4th), final grade may be lowered 5 points from initial grade.

--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)

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. Attitude objectives: 20 %
 2. Skills objectives: 50%
 3. Knowledge objectives: 30%

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.

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

1. HEALTH AND SAFETY
What is Ozone, The Earth's Atmosphere, Absorption of Ultraviolet Radiation, The ozone hole, The clean air Act 21, Compressor
2. HISTORY AND PURPOSE
Introduction, Air conditioning defined, Refrigeration, Historical development of refrigeration, Personal comfort and convenience, Heat and cold, The Industry
3. TEMPERATURE AND PRESSURE FUNDAMENTALS
The Atom, The molecule, Sensible heat of a liquid, Latent heat of vaporization, Metering devices
4. THE REFRIGERATION SYSTEM
System diagnosis, Handling refrigerant, Refrigerant temperature and pressure relationship
5. SYSTEM COMPONENTS
Compressor, Receiver-drier, Thermostatic expansion valve, Evaporator, The refrigeration cycle
6. COMPRESSOR AND CLUTCHES
Function, Reciprocating or piston-type compressors, Action (reciprocating or piston type), Variable-displacement compressors
7. SYSTEM SERVICING, TESTING, AND DIAGNOSING
Leak detectors, Moisture and moisture removal, Recovery systems, Charging the system with refrigerant
8. CASE AND DUCT SYSTEMS
Air intake, Core section, Combined case, Air delivery
9. RETRO (CFC-12 TO HFC-134a)
Replacement refrigerants, Contaminated refrigerant, Disposal of contaminated refrigerant, Retrofit components
10. SYSTEM CONTROLS
Fuses and circuit breakers, Pressure cut-off switch, Compressor discharge pressure switch, Electronic temperature control systems
11. ENGINE COOLING AND COMFORT HEATING SYSTEMS
The cooling system, Pulley and belt, Fan clutch, Heater system

III. ACCOMMODATIONS:

1. See "Equal opportunity" statement in the South Plains College catalog.
2. See "Services for Students with Disabilities" statement in the South Plains College catalog.
3. See "Special Services" statement in the South Plains College catalog.