

COURSE SYLLABUS

AUMT 1345.081 (3:2:4)

**HEATING AND AIR CONDITIONING**

AUTOMOTIVE SERVICE TECHNOLOGY

INDUSTRIAL TECHNOLOGY

TECHNICAL DIVISION

***SOUTH PLAINS COLLEGE IMPROVES EACH STUDENTS LIFE***

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**COURSE SYLLABUS**

**COURSE TITLE:** AUMT 1345 HEATING AND AIR CONDITIONING (3:2:4)

**INSTRUCTOR:** Gary Ham

**OFFICE LOCATION** Auto/Diesel Building Office # 102

**PHONE/E-MAIL:** 806-716- 2296 gham@southplainscollege.edu

**OFFICE HOURS:** Check posted hours after classes begin or by appointment

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**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.The student must also be able to utilize allocated time prudently in the completion of the assigned task.
- 6 Forecast completion cost based on interpretation of customer complaints.
- 7 Demonstrate proper use of manuals and equipment to properly complete a task.
- 8 Accomplish as a group, a task requiring various skills and completion. Must be effected in the most efficient manner.

- 9 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” In addition, the student will also be prepared to take the ASE Student Certification test for Heating and AC.

## II. SPECIFIC COURSE/INSTRUCTOR REQUIREMENTS:

- Textbook and Other Materials:
- ***No textbook is required for this class. Materials will be assigned from the Ford ACE Program website. Log in to Blackboard for this course to access the Ford website.***
- 8 ½ x 11 notebook for classroom note taking and assignments
- Students are encouraged to possess a basic tool set for the program by the 12<sup>th</sup> class day.
- Clear Safety Glasses.
- Face Covering

- 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” or “F” 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.** If the excessive absence occurs after the official drop date at the end of the semester, a grade of "F" will be issued. *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 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. Attendance will be mandatory for cleanup in order to be admitted to final exams.

#### 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.

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: Safety Exam: The student must pass a safety exam with a score of 100 to continue lab assignments.

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.

At the end of the semester students will have the opportunity to take a Student ASE exam. **Students must be in good standing with a 70 average or above to take the exam.**

### **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. Safety Data Sheets (SDS) information will be posted outside of office number 102. 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

#### Unit 1: Fundamental Principles of Heating and Air Conditioning (Syllabus Title)

1. F10101200301 01 – Course Introduction
2. F10101200302 02 – HVAC Components and Operation

#### Unit 2 : Cooling and Heating System Servicing (Syllabus Title)

1. F10101200303 03 – Heating System Inspection and Service
2. 35S01W101 – Course Introduction
3. 35S01W102 – Engine Cooling and Heating Systems

#### Unit 3: Electrical and Vacuum Passenger Compartment Air Flow Servicing (Syllabus Title)

1. F10101200304 04 – A/C and Ventilation Inspection and Service
2. 35S01W103 – Supplemental Heating Systems
3. F412102103 – Auxiliary Heaters

#### Unit 4: A/C System Components and Function, Equipment, Evacuation, Recycle, Recharge, and Leak Detection (Syllabus Title)

1. 35S01W104 – Physical Principles of Refrigerant
2. 35S01W105 – Air Conditioning Refrigerant System
3. F412102103 – Rear Climate Control Systems

#### Unit 5 and Unit 6 combined: A/C System Diagnosis, Retrofitting, Electronic Control and Hybrid Systems Diagnosis and Repair (Syllabus Title)

1. F412102103 – Course Introduction
2. F412102103 – General Information
3. F412102103 – Auto Start – Stop and Remote Start
4. F412102103 – Electric Vehicles
5. 30N26W309 – Hybrid Climate Control Systems

Homework and Exam schedule to be announced

### III. ACCOMMODATIONS:

“Students can find statements for:

Intellectual Exchange, Disabilities, Non-Discrimination, Title IX Pregnancy Accommodations, CARE (Campus Assessment, Response, and Evaluation) Team, and Campus Concealed Carry at [Syllabus Statements \(southplainscollege.edu\)](https://southplainscollege.edu/SyllabusStatements)

### 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.\_\_

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- 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

