

Angelina College
Technology and Workforce Division
Automotive Climate Control Systems AUMT 1445
Instructional Syllabus

I. BASIC COURSE INFORMATION:

- A. Course Description: *(as stated in the bulletin, including necessary pre-requisite courses, credit hours)*
AUMT 1445: Theory of automotive air conditioning and heating systems. Emphasis on basic refrigeration cycle and diagnosis, retrofit, and repair of system malfunctions. Covers EPA requirements on recovery of coolants, coolant handling and new refrigerant handling and replacements. Prepares student for ASE testing.
- B. Intended Audience: Second Semester Automotive Students
- C. Instructor:
Name: Mark Yarnall
Office Location: Industrial Technology Building
Office Hours: 7:00-7:30am Mon thru Thurs 8:00-10:00am Friday
Phone: 936-633-5252
E-mail Address: myarnall@angelina.edu

II. INTENDED STUDENT OUTCOMES:

A. Core Competencies – (Basic Intellectual Competencies)

1. **Communication:** Competency in reading at the college level means the ability to analyze and interpret a variety of printed materials – books, articles, and documents. A core curriculum should offer students the opportunity to master both general methods of analyzing printed materials and specific methods for analyzing the subject matter of individual disciplines. Competency in writing is the ability to produce clear, correct, and coherent prose adapted to purpose, occasion, and audience. Although correct grammar, spelling, and punctuation are each a sine qua non in any composition, they do not automatically ensure that the composition itself makes sense or that the writer has much of anything to say. Students need to be familiar with the writing process including how to discover a topic and how to develop and organize it, how to phrase it effectively for their audience. These abilities can be acquired only through practice and reflection. Competence in speaking is the ability to communicate orally in clear, coherent, and persuasive language appropriate to purpose, occasion, and audience. Developing this competency includes acquiring poise and developing control of the language through experience in making presentations to small groups, to large groups, and through the media. Listening at the college level means the ability to analyze and interpret various forms of spoken communication.
2. **Critical Thinking:** Angelina College defines critical thinking as the dynamic process of questioning preconceptions and biases through the gathering and evaluation of data to reach new conclusion that consider realistic implications and consequences.
3. **Empirical and Quantitative Skills:** to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

- B. Exemplary Objectives –** *(Found in the Texas Higher Education Coordinating Board Document. Titled: CORE CURRICULUM: ASSUMPTIONS AND DEFINING CHARACTERISTICS Dated: April 1998)*
Not applicable for courses in the Technology & Workforce Division.

C. Course Objectives – *(common to all sections)*

1. Understand the basic refrigeration cycle
2. Learn proper recovery and recycle processes
3. Understand proper diagnostics of HVAC electrical systems
4. Ability to diagnose and perform complete HVAC service
5. Pass 609 Refrigerant handling certification test

III. ASSESSMENT MEASURES OF STUDENT LEARNING OUTCOMES:

A. Assessments for the Core Intellectual Competencies –

1. Communication – Reading - Textbook chapters will be assigned to students by the semester schedule. Writing – The students will be given one writing assignment per semester, subject to be determined by the instructor. Speaking – The students will be asked to respond to questions asked by the instructor during lecture periods. Listening – Listening will be measured by the students appropriately interpreting spoken communication and developing appropriate responses to spoken communication.
2. Critical Thinking – The students will be asked to evaluate and respond to different problems as presented by the instructor during lecture periods.
3. Empirical and Quantitative Skills – the students will be evaluated by written and oral questions in the classroom and lab setting that will require the manipulation and analysis of numerical data or observable facts that will result in informed conclusions.

B. Assessments for Course Learning Outcomes –

1. Study heat and cooling distribution. Students will demonstrate knowledge by correctly responding to examination questions.
2. Identify AC and heating system components and functions. Students will demonstrate knowledge by correctly responding to examination questions.
3. Discuss refrigeration and coolant flow, function and theory, diagnosis and repair HVAC systems. Students will demonstrate knowledge by correctly responding to examination questions.

IV. INSTRUCTIONAL PROCEDURES:

A. Methodologies common to all sections

Students will receive two hours of lecture and six hours of lab per week.

B. Methodologies determined by the instructor

NA

V. COURSE REQUIREMENTS AND POLICIES:

A. Required Textbooks, Materials and Equipment –

Textbook: Automotive Technology A Systems Approach 6th Edition By Jack Erjavec and Rob Thompson with MindTap Access

Tools: Student must provide their own set of tools and tool storage from approved list at the end of this syllabus.

B. Assignments – (Appropriate due dates, schedules, deadlines)

1. *Service Information, Fasteners, Tools and Safety*
2. *Environmental and Hazardous Materials*
3. *Basics of Heating and Air Conditioning*
4. *Heat Movement Theory*
5. *Refrigerants and the Environment*
6. *Moving Heat: Heating and Air Conditioning Principles*
7. *Air Conditioning Systems*
8. *Air Conditioning System Components*
9. *Heating Systems*
10. *Air Management Systems*
11. *HVAC System Inspection and Trouble Diagnosis Procedures*
12. *A/C System Inspection and Diagnosis*
13. *Heating and Air Management Systems Inspection and Diagnosis*
14. *HVAC System Electrical and Electronic Controls: Theory, Inspection, Diagnosis and Repair*
15. *Refrigerant Service Operations*
16. *A/C System Repair*
17. *Cooling System Theory*
18. *Cooling System Inspection, Trouble Diagnosis, and Service*

C. Course Policies – (This course conforms to the policies of Angelina College as stated in the Angelina College Handbook.)

Educational Accommodations – If you have a disability (as cited in Section 504 of the Rehabilitation Act of 1973 or Title II of the Americans with Disabilities Act of 1990) that may affect your participation in this class, you may fill out the Educational Accommodations application within your AC Portal, under the “Student Services” tab. A Student Success team member will contact you once the application is received. At a post-secondary institution, you must self-identify as a person with a disability in order to receive services; for questions regarding the application process you can visit the Office of Student Success and Inclusion in the Student Center (205A); text 936.463.8078; or email access@angelina.edu. To report any complaints of discrimination related to a disability, you should contact Mr. Steve Hudman, Dean of Student Affairs, in Room 101 of the Student Center. You may also contact Dean Hudman by calling (936) 633-5292 or by emailing shudman@angelina.edu.

Attendance – See Bulletin.

Additional Specific Requirements for this Course –

- A. Academic Requirements: Students will be expected to complete all required reading and homework assignments, complete all required lab work and demonstrate competency to the instructor.
- B. There will be pop tests for student-only information and 3 major tests throughout the semester(see course outline), and successful completion of required competencies.
- C. Administrative Requirements: The students are allowed a minimum of 3 consecutive or 4 accumulative absences before being dropped. Missing assignments are given an automatic "0". Late assignments are due upon return to class or an automatic "0". Students will be given a one-time chance on a makeup exam.

VI. COURSE CONTENT:

A. Content/ Topics - (as required by the individual Instructor)

Operation and repair of automotive climate control systems. Topics include AC theory, safe refrigerant handling practices, heat and engine cooling systems, and manual and computer HVAC control systems.

B. Additional Content

NA

VII. EVALUATION AND GRADING:

A. Grading Criteria

Students will be graded on the basis of their test grades. Absences will be taken into considerations.

B. Determination of Grade

- A. Test #1
- B. Test #2
- C. Test #3
- D. Test #4
- E. Midterm
- F. Test Average
- G. Final Exam
- H. Writing and reading assignment grade
- I. Speaking and critical thinking grade
- J. Attendance
- K. Average of Competency Profile Grade
- L. Overall Grade (F+G+K)/3=
- M. Final Grade will be awarded based on
 - 90 – 100 = A
 - 80 – 89 = B
 - 70 – 79 = C
 - 69 or less = F

VIII. SYLLABUS MODIFICATION:

The instructor may modify the provisions of the syllabus to meet individual class needs by informing the class in advance as to the changes being made.

Craftsman Tools (Sears)

476 piece VoTech starter set

00921473000P D302400 \$1525

VoTech Auto Add On

00921452000P D302410 \$850

½" impact wrench

00951115000P 51115 \$200

26 inch 10 Drawer heavy duty ball bearing 2 pc Combo \$290

Craftsman total \$2865 Craftsman offers a student discount program that may make this total lower, you must sign up on the Craftsman website.

Snap-on Tools Student Discount program

Advanced automotive set

SEPAADS \$2991

Add on Group 3

9000GS30 \$1928

Automotive Multi-meter kit

MTIND683ASEP \$132

Roll Cart 3 drawers

KRSC33AP \$559

Snap-on total \$5610 You must register for the Snap-On student program to receive these prices

Mac Tools

265 piece Master set #1

MTS100AS \$3100

79 piece Master set #7 (Impact and sockets)

MTS700AS \$2700

3 Drawer Utility cart

MB199UC \$?

The MAC tools website says that they give 50% off for students that register for their program so the total for the tools sets should be about \$3000 plus the cost of the cart.

Matco Tools

Auto Master set

24795348 \$3828

Sliding top cart 5 drawer

STC50 \$738

Matco total \$4566 You must register for the Matco Student program to receive these prices.