

**MIDLAND COLLEGE**  
**SYLLABUS**  
**HART 1407**  
**REFRIGERATION PRINCIPLES**  
**3-3**

**Course Description:**

An introduction to the refrigeration cycle, basic thermodynamics, heat transfer, temperature/pressure relationship, safety, refrigeration containment, metering devices, and refrigeration components. The student will learn proper soldering and brazing techniques using oxy-acetylene and air-acetylene. The student will also be introduced to the proper use of hand tools and test instruments required in both service and installation. **This course and HART 1401 must be taken first as the prerequisite to all the HART classes.**

**Text, References, and Supplies:**

1. **REFRIGERATION AND AIR CONDITIONING TECHNOLOGY**, Current Edition, Whitman & Johnson.
2. **REFRIGERATION AND AIR CONDITIONING TECHNOLOGY LAB MANUAL**, Whitman & Johnson.
3. Industry Literature

**Course Goals/Objectives:**

This class is designed to teach basic skills necessary for a service person in the air conditioning and refrigeration industry. The following list of course goals will be addressed in the course. These goals are directly related to the performance objectives. Upon successful completion of the course the student will:  
(\* designates a CRUCIAL Goal)

1. Develop *safe* work habits.
2. Display *work habits*.
3. Maintain a *clean* and *orderly* shop.
4. Define *British Thermal Unit*.
5. Define *latent heat*.
6. Define *refrigeration ton*.
7. Define *sensible heat*.
8. Define *specific heat*.
9. Convert *area measurements*.
10. Convert *volume measurements*.
11. Calculate *cubic volume*.
12. Calculate *cylinder volume*.

13. Calculate *latent heat*.
14. Calculate *sensible heat*.
15. Make a proper *flare fitting*.
16. Make a *swaging tool joint*.
- \*17. Demonstrate *air acetylene torch operation*.
- \*18. Demonstrate proper *oxygen and acetylene torch usage*.
19. Demonstrate *tubing bender operation*.
20. Solder copper tube using *sil-fos*.
21. Solder copper tube using *silver solder*.
22. Solder copper tube using *6% stay brite soft solder*.
23. Identify the four main *refrigeration system components*.
24. List the seven steps of the *refrigeration cycle*.
25. Display *P/T chart* knowledge.
26. Explain *capillary tube operation*.
27. Demonstrate a *halide torch leak test*.
28. Demonstrate a *soap bubble leak test*.
29. Demonstrate an *electronic leak- detector leak test*.
- \*30. Demonstrate *manifold gauge operation*.
31. Demonstrate *service manifold standing pressure test*.
32. Demonstrate *vacuum pump operation*.
33. Explain *refrigeration service valve operation*.
34. Explain *AEV valve operation*.
35. Convert a *capillary system* to an *AEV system*.
36. Adjust a *low pressure control*.
37. Demonstrate the *dial-a-charge* charging procedure.
- \*38. Measure *superheat*.
- \*39. Measure *sub-cooling*.
40. Explain *TXV valve operation*.
41. Explain *EPR valve operation*.
42. Explain *CPR valve function*.
43. Explain *CPR valve operation*.
44. Explain *winterizing valve operation*.
45. Explain *hot gas bypass valve operation*.

**Student Contributions and  
Class Policies:**

Each student will spend at least 4 hours per week preparing for class. As a student in this course you are expected to display respect, professional behavior, and a cooperative attitude at all times. Punctual attendance is critical in this class due to the extent of the material. The college attendance policy will be strictly adhered to. The student is expected to be prepared to work and to participate in all class activities.

<b>Evaluation of Students:</b>	Lab	30%
	Quizzes & Homework	25%
	Attitude & Attendance	20%
	Final Examination	<u>25%</u>
	Total	100%

**Course schedule:** The class meets for 6 lecture hours and 6 lab hours per week for 8 weeks

**SCANS Information:** The following SCANS skills will be taught and/or reinforced in this course.

**INTERPERSONAL:**

Works with others. Works cooperatively with others and contributes to the group with ideas, suggestions, and effort. Helps others learn.

**INFORMATION:**

Acquires, evaluates, interprets and communicates information. Uses computers to acquire and communicate information.

**TECHNOLOGY:**

Chooses procedures, tools or equipment including computers and related technologies. Prevents, identifies, or solves problems with equipment.

**WRITING:**

Communicates thoughts, ideas, information, and messages in writing; records information completely, and accurately; creates graphs, reports and charts.

**Safety Glasses Policy:** It is required that all persons in the Air Conditioning Program wear eye protection while in the lab. Students are required to furnish their own protection. Visitors will be supplied with a pair of glasses to be used during their visit. If you have any questions about this policy, please ask your instructor to clarify them for you.

**Instructor Information:**

Jaroy Roberts, Instructor  
Room 187TC  
(432) 685-4687 Office  
(432) 349-5913 cell  
E-Mail: [jroberts@midland.edu](mailto:jroberts@midland.edu)

Office Hours: Posted

Curt Pervier, Applied Technology Dean  
Lisa Hays, Applied Technology Division Secretary  
(432) 685-4676  
Fax: (432)685-6472

Students are encouraged to contact the instructor at any time; however, making an appointment will guarantee the instructor's availability at a specific time.

**\*Students MUST actively participate by completing an academic assignment required by the instructor by the official census date. Students who so not actively participate in an academically-related activity will be reported as never attended and dropped from course.**

**Americans with Disabilities Act (ADA) Statement:**

Midland College provides services for students with disabilities through Student Services. In order to receive accommodations, students must visit [www.midland.edu/accommodation](http://www.midland.edu/accommodation) and complete the Application for Accommodation Services located under the Apply for Accommodations tab. Services or accommodations are not automatic, each student must apply and be approved to receive them. All documentation submitted will be reviewed and a "Notice of Accommodations" letter will be sent to instructors outlining any reasonable accommodations.

**Midland College Non-Discriminatory Statement:**

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## Spanish

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