

Oklahoma State University Institute of Technology
Face-to-Face Common Syllabus
Spring 2018

ACR 1126-ACR SYSTEM APPLICATIONS

This course covers the use of hand tools and industry specific tools, as well as copper tube flaring, swaging, cutting and brazing. It includes the theory of the compression refrigeration cycle to include components which make up a refrigeration system, and the operation and analysis of basic refrigeration systems including evacuation, charging, recovery, control adjustments and efficiency checks. Also emphasizes career opportunities in the air conditioning and refrigeration fields and continues the student's work on the Career Passport.

Course Purpose:

This course introduces the student to the mechanical side of a refrigeration system. The knowledge that the student will learn in this class will assist them in the other classes in the ACR department.

Type of Course: Theory/Lab

Credit Hours: 6; Total clock hours of theory per semester: 60;

Total clock hours of lab per semester: 90;

Class Length: Full Semester

Class Days and Times: M-F 1:30 – 3:25 Theory Room #109 Lab Room #110

Prerequisites: None

Instructor Name: Chris Lamm

Instructor Phone: (918) 293-5312

Office: Building #315, Room #114B

Instructor Email: chris.lamm@okstate.edu

Contact: My preferred method of contact is email. Please allow 24-48 hours to return your correspondence during the normal work week.

Instructor's Office Hours: 10:30 – 11:30 T & Th.

Other times available by appointment

School Name: Construction Technologies

School Main Phone: 918-293-5304

REQUIRED TEXT, REFERENCES, AND MATERIALS

Texts: Refrigeration & Air Conditioning Technology, Eighth Edition,
Delmar publishing ISBN#978-1-305-57829-6/\$185.00
Department OSUIT printed lab manual \$25.00

References: N/A

Materials: Paper, lead pencils, colored pencils, calculator, highlighter, ruler and USB
memory device \$25.00

Uniform/Tools: Departmental issued toolbox \$700.00

Estimated Cost for Materials: \$ 235

Estimated Cost for Uniform/Tools: \$ 700

Optional Resources: ISBN10: 1-305-57829-5: Digital version of the textbook

Upon completion of the course, students should:

Course Objectives	Assessment of Objectives
*Describe the mechanical refrigeration process and function of the controls	70% in 1126 Lab manual
*Demonstrate knowledge by measuring system pressures and temperatures	70% in 1126 Lab manual
*Demonstrate recovery, evacuation, charging, a refrigeration system and calculate superheat and subcooling	70% in 1126 Lab manual
*Diagnose problems associated with components and controls in the refrigeration system	70% in 1126 Lab manual
*Demonstrate the ability to interpret and create mechanical diagrams	70% in 1126 Lab manual
*Demonstrate the ability to diagnose and repair mechanical systems	70% in 1126 Lab manual
*Perform copper brazing skills to industry standards	70% in 1126 Lab manual
*Complete copper brazing projects to pass a pressure test	70% in 1126 Lab manual

Aspects of the course objective assessments may be used in the university's assessment of student learning. If applicable, an asterisk (*) above indicates this assignment is used in the university assessment program.

COURSE ACTIVITIES

In this course students will:

- Participate in class discussions and activities.
- View videos that depict the various concepts
- Take examinations.
- Complete reading assignments and homework
- May be required to do quizzes.

EVALUATION - GRADES WILL BE BASED ON THE QUALITY AND COMPLETION OF THESE TASKS:

Theory: Unit Tests, homework, & pop quizzes, final exam.	50%
Lab assignments	<u>50%</u>
Final Grade	100%

OSUIT Grading Scale
A = 90%-100%
B = 80%-89%
C = 70%-79%
D = 60%-69%
F = 59% & below

There will be a point total to determine the overall grade. This will consist of the points for homework, tests and pop quizzes. Pop quizzes or even announced quizzes cannot be made up. Tests can be made up but with a 10% deduction assessed per day and a forfeit of bonus points (if offered). The total points for the theory class assignments will be divided by the student's total points. This will give a decimal number. The decimal is then moved two places to right for a percentage grade. Lab grade will be assessed from most number of jobs accomplished by a student. Your job total divided by their job total will calculate the total. The same formula will be used to determine lab grade percentage. The two grades will then be added together and divided by two for a final grade. Homework answers can be handwritten or typed.

*The student's grade for this assignment will be used in the university's assessment of student learning. A 70% competency or higher receives a Pass rating. This Pass/Fail rating is independent of the student's course grade.

Daily and/or weekly quizzes, small weekly assignments and similar type projects: Normal return time to student by next class meeting or no later than one (1) week.

Extensive assignments, large lab projects, extensive quizzes, exams and similar type projects: Normal return time to students in one (1) to two (2) weeks.

RECOMMENDED STUDENT COMPETENCIES/SKILLS

The students should have a working knowledge of basic hand tool usage. The ability to read a tape measure will also be a benefit to the student.

AUTHORIZED TOOLS

Students may use any/all course materials, including books and notes, while participating in classroom activities and the lab assignments. All quizzes and tests are to be completed independently; no collaboration with classmates is permitted and any instance of such will be considered academic dishonesty.

LATE WORK

Homework is due on the day it is assigned. A 10% late fee per day will be assessed. Tests are given on the day assigned. A 10% late fee per day will be assessed and no bonus points. Quizzes cannot be made up. Test bonus questions are only good on announced test day.

TESTING

Testing will be conducted in a quiet setting. Any questions need to be addressed only to the instructor, not fellow students(s).

Testing will be during the first part of a class period.

OTHER LAB AND CLASSROOM POLICIES

The classroom environment will simulate a professional work environment. Please refrain from using your cell phone in class for non-classroom activities. Students are permitted to use laptops, tablets, and cell phones to follow the power points presented in class or take notes.

SYLLABUS ATTACHMENT

View the Syllabus Attachment, which contains other important information, by visiting http://osuit.edu/center/student_syllabus_information

Course Schedule				
Date	Module Description	Estimated Time	Topic (additional resources)	Assessment
1-4/1-5	Orientation	1 Theories (2 hours)	-Requirements and Policies of ACR 1126. Discuss course syllabus and course schedule. -Lab Tour and Safety Orientation (Course Syllabus and Handout)	N/A
1-8 to 1-12	Tools and Safety	2 Theories (4 hours)	-Introduction and Familiarization with general hand tools, as well as, ACR industry specific tools. (Slide Presentation & Text: Unit 4 and 5)	Written Exam
1-15	*****	*****	Martin Luther King Jr Holiday	*****
1-16 to 1-26	Soldering and Brazing	4 Theories (8 hours)	-Theory and Principles of Fuel/Oxygen Soldering and Brazing Safety (Slide Presentation & Text: Unit 5 and 7)	Written Exam
1-29 to 2-9	Thermodynamics	3 Theories (8 hours)	-Principles of Heat Transfer, the Gas Laws, and the systems of measurement. (Slide Presentation & Text: Unit 1 and 2)	Written Exam
2-12 to 3-2	Mechanical Refrigeration Cycle and Enthalpy	5 Theories (8 hours)	-The 4 basic components of the Cycle and Refrigerant flow. -The flow of refrigerant in the Mechanical Refrigeration Cycle as it relates to Net Refrigeration Effect. (Slide Presentation & Text: Unit 3)	Written Exam
3-5 to 3-16	Compressors	3 Theories (6 hours)	-Different types of Compressors and Vapor Compression (Slide Presentation & Text: Unit 23)	Written Exam
3-19 to 3-23	*****	*****	*****SPRING BREAK*****	*****
3-26 to 4-6	System Components	4 Theories	-Pressure and Temperature Controls -Air and Water cooled Condensers and Evaporators (Slide Presentation & Text: Unit 21 and 22)	Written Exam
4-9 to Final	Metering Devices	4 Theories	-Different types of Metering Devices and their function. (Slide Presentation & Text: Unit 24)	Written Exams

Schedule is subject to change at instructor discretion.