

El Paso Community College

Syllabus

Part II

Official Course Description

SUBJECT AREA	<u>Heating, Ventilation, and Air</u> <u>Conditioning</u>
COURSE RUBRIC AND NUMBER	<u>HART 2442</u>
COURSE TITLE	<u>Commercial Refrigeration</u>
COURSE CREDIT HOURS	<u>4 3 :</u> Credits Lec Lab

I. Catalog Description

Theory and practical application in the maintenance of commercial refrigeration; medium and low temperature applications and ice machines. Upon successful completion of OSHA training, students may receive the OSHA Certification. **Prerequisites: HART 1401 and HART 1407. (3:3). Lab fee.**

II. Course Objectives

- A. **Unit I. General Discussion**
1. List the four basic types of commercial refrigeration equipment.
 2. List six types of businesses that use this commercial refrigeration equipment.
 3. List the types of equipment that each business uses.
 4. Differentiate between high, medium, low temperature systems.
- B. **Unit II. Components**
1. Describe the construction and component locations in each of the four refrigeration system types.
 2. Describe the refrigerants and the major components used in commercial refrigeration systems.
 3. List the accessories used in these systems.
 4. Describe the functions of the accessories in these systems.
- C. **Unit III. System Operation**
1. Describe the normal operation of the two most common commercial refrigeration systems.
 2. List nine types of abnormal commercial refrigeration system operations (including superheat adjustment problems and accessory malfunctions).
 3. Describe the operation of each of the nine abnormally operating commercial systems.
 4. List several means of detecting each system malfunction.
 5. Identify operation of rack system.
 6. Identify sequence of operation on walk- ins.
 7. Identify sequence of operation on ice machine.
- D. **Unit IV. Load Calculations**
1. Calculate refrigeration load using load-estimating forms.
 2. Select all the components of a commercial refrigeration system, using the information from the load estimating form and manufacturer's catalogs.

- E. **Unit V. Control Devices**
 - 1. List the electrical control devices used on commercial refrigeration systems.
 - 2. Explain the functions of these devices in the electrical control circuits.
 - 3. Troubleshoot and repair or replace electrical control devices.
 - 4. Identify and adjust EPR (evaporator pressure regulator) valves.
 - 5. Repair ice machine.
 - 6. Adjust ice thickness sensor
 - 7. Identify and adjust dual pressure controls.

- F. **Unit VI. Commercial Refrigeration Servicing**
 - 1. Clean condenser coils, evaporator coils and pan.
 - 2. Detect systems malfunction and make necessary repairs.
 - 3. Check for proper operating pressures, temperatures, voltages, and amperages.
 - 4. Troubleshoot and repair a walk-in unit.
 - 5. Troubleshoot and repair a reach-in case.
 - 6. Troubleshoot and repair a display case.
 - 7. Troubleshoot and repair a beverage cooler.
 - 8. Clean, sanitize, troubleshoot and repair ice machines.
 - 9. Install various commercial refrigeration systems.
 - 10. Follow preventive maintenance schedule.
 - 11. Verify overall equipment performance
 - 12. Identify type of refrigerant
 - 13. Identify and repair water fountain systems.
 - 14. Service water cooled heat exchangers.

- G. **Unit VII. Safety**
 - 1. Use personal protective equipment.
 - 2. Practice ladder safety.
 - 3. Verify operating high and low limits.
 - 4. Ensure that equipment is properly grounded.
 - 5. Apply proper procedures for handling refrigerants.
 - 6. Read MSDS sheets.

III. THECB Learning Outcomes (WECM)

- 1. Explain and apply medium and low temperature systems operation.
- 2. Explain and apply ice machine and packaged refrigeration system operation.
- 3. Explain application and conversion procedures of refrigerants related to specific system.

IV. Evaluation

A. Challenge Exam

Students who wish to challenge the course should contact the Testing Center and the Division Dean. Challenges must be accomplished before the census cut-off date. Students who previously have received a W or a letter grade for the course are not eligible to challenge the course.

B. Homework Assignments and Quizzes

Students are required to turn in review questions at the end of each unit, of the textbook, upon completion of that unit. The students will be given two quizzes: these grades will constitute 30% of the final grade.

C. Lab Assignment 40% of final grade

D. Final Exam

Will constitute 30% of final grade

E. Grading Scale:

I = Incomplete	
W = withdrew or withdrawn	
90-100	A
80-89	B
70-79	C
60-69	D
0-59	F

V. Disability Statement (Americans with Disabilities Act [ADA])

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

VI. 6 Drop Rule

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.

VII. Title IX and Sex Discrimination

Title 9 (20 U.S.C. 1681 & 34 C.F.R. Part 106) states the following "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any educational program or activity receiving Federal financial assistance." The Violence Against Women Act (VAWA) prohibits stalking, date violence, sexual violence, and domestic violence for all students, employees and visitors (male and female). If you have any concerns related to discrimination, harassment, or assault (of any type) you can contact the Assistant to the Vice President for Student and Enrollment Services at 915-831-2655. Employees can call the Manager of Employee Relations at 915-831-6458. Reports of sexual assault/violence may also be reported to EPCC Police at 915-831-2200.