

**El Paso Community College**  
**Syllabus**  
**Part II**  
**Official Course Description**

<b>SUBJECT AREA</b>	<u>Heating, Ventilation and Air Conditioning</u>
<b>COURSE RUBRIC AND NUMBER</b>	<u>HART 2441</u>
<b>COURSE TITLE</b>	<u>Commercial Air Conditioning</u>
<b>COURSE CREDIT HOURS</b>	<u>4        3        3</u> Credits   Lec     Lab

**I. Catalog Description**

Studies components, applications, and installation of air conditioning systems with capacities of 25 tons or less. The United States Environmental Protection Agency Certification Exam (EPA Certificate) will be given to the student. **Prerequisites: HART 1407 and HART 1441. (3:3). Lab fee.**

**II. Course Objectives**

- A. **Unit I. Air Conditioning General Discussion and Load Characteristics**
  - 1. Obtain EPA certification.
  - 2. List the three major types of heat loads.
  - 3. Determine from the given data, which areas of a large building will most likely to require heating or cooling.
  - 4. Describe the range of heating and cooling requirements commonly encountered in a large multi-use building
  
- B. **Unit II. Types of Systems**
  - 1. List the five basic types of air conditioning systems and installation.
  - 2. Tell how the most commonly used systems of each type functions (list and verify components from vendor of the systems and describe how those parts function in relation to the total system).
  - 3. Explain how each system provides for simultaneous heating and cooling.
  - 4. Install, maintain, and repair evaporative coolers.
  - 5. Itemize and identify evaporative cooler components.
  
- C. **Unit III. Components of Chilled Water System**
  - 1. Name five major parts of a centrifugal refrigerating machine (also called a chiller) and explain how the parts function.
  - 2. List five major parts of a reciprocating refrigerating machine and explain how the parts function.
  - 3. List eight major components of a large air conditioning system in which chilled water is used for cooling.
  - 4. Explain the functions of each component of the system just described.
  
- D. **Unit IV. Control Devices**
  - 1. List the control devices used in several different systems.
  - 2. State the function of each device.

- E. **Unit V. Multi-story Building Air Conditioning**
1. Explain how buildings are divided into zones for heating, ventilation and air conditioning.
  2. List the zones and the air conditioning systems used for each zone for the sample given.
- F. **Unit VI. Air Conditioning Servicing**
1. Describe the functioning of each system, the chillers, and the cooling towers.
  2. Service for seasonal changeover, i.e., clean or change filters, clean condenser and evaporator coils, clean condensate pan, straighten fins, oil or grease bearings, and clean blower wheels.
  3. Conduct water analysis on cooling tower and closed loop systems.
  4. Identify refrigerants and check for proper refrigerant levels.
  5. Check for proper operation of high and low pressure controls.
  6. Troubleshoot and repair various types and models of air conditioning systems.
  7. Verify overall equipment performance, including proper pipe insulation.
  8. Follow maintenance schedule on evaporative coolers, itemize parts, identify parts, and repair.
  9. Identify ventilation components.
- G. **Unit VII. Ventilation**
1. Verify if air is toxic or non-toxic.
  2. Perform indoor air quality checks.
  3. Measure and identify supply/return airflow velocity and volume.
  4. Balance intake and exhaust air volume.
- H. **Unit VIII. Safety**
1. Use personal protective equipment.
  2. Practice ladder safety.
  3. Practice proper handling of pressure vessels.
  4. Verify operating high and low limits.
  5. Ensure that equipment is properly grounded.
  6. Apply proper procedures for handling refrigerants.
  7. Check for water leaks.
  8. Verify CO levels.

### **III. THECB Learning Outcomes (WECM)**

1. Apply and describe the sequence of operation for commercial air conditioning systems and their accessories.
2. Identify components relative to commercial air conditioning.
3. Explain energy efficient and renewable energy technologies.

### **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 Assignments**

These assignments will constitute 40 % of final grade.

**D. Final Exam**

These 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.