

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 2445</u>
COURSE TITLE	<u>Residential Air Conditioning</u> <u>Systems Design</u>
COURSE CREDIT HOURS	<u>4 3 :</u> <u>Credits Lec Lab</u>

I. Catalog Description

Studies the properties of air and results of cooling, heating, humidifying or dehumidifying; heat gain and heat loss calculations including equipment selection and balancing the air system. **Prerequisite: HART 1441. (3:3). Lab fee.**

II. Course Objectives

A. Unit I. Air Conditioning and Psychometrics

1. Describe the processes by which the body produces and rejects heat.
2. Discuss the conditions-temperature, humidity and air movement-which body heat.
3. Define psychometrics.
4. Define the terms dry bulb temperature, wet bulb temperature, relative humidity, grains of moisture, temperature.
5. Identify the lines and scales which represent these terms on the psychometric chart.
6. Use a psychometric chart to determine the condition of air.

B. Unit II. Heat Load Calculation Factors

1. Identify the heat sources that affect the cooling cycle.
2. Describe the variations in the solar heat load through glass areas of a building in relation to the time of day.
3. Define stored cooling capacity.
4. Describe the use of zoning as an effective method of handling varying load calculations.
5. Identify the heat losses that affect the heating load.
6. List what effects construction materials, water sprays, ventilation, infiltration, people and lighting have on the estimation of heat load.

C. Unit III. Heat Load Calculation Procedure

1. State the procedure for calculation of heat gains.
2. State the purpose of a load estimate.
3. Use forms and associated tables to estimate the air conditioning load (both heating and cooling).

D. Unit IV. Equipment Sizing and Selections

1. Determine the proper size of equipment to be used from load calculations.
2. Select and install the proper sized equipment.

- E. **Unit V. Equipment Location**
 - 1. List the factors for selecting the best location for installation of equipment.
 - 2. Identify the best location for installation of equipment.
 - 3. Follow manufactures' installation manuals (IOM)
- F. **Unit VI. Refrigeration Lines**
 - 1. Describe the factors that must be considered in refrigeration line sizing.
 - 2. Size the refrigerant lines to match the equipment.
- G. **Unit VII. Duct System Design**
 - 1. Discuss the factors that must be considered in selecting and sizing duct systems
 - 2. Design and install air distribution systems.
 - 3. Identify sheet metal equipment and tools.
 - 4. Interpret static pressure.
 - 5. Identify and service flow/ fume hood.
 - 6. Identify and troubleshoot exhaust fans.
 - 7. Calculate proper CFM reading using ductulator.
- H. **Unit VIII. Duct Pipe, Fittings, and Insulation**
 - 1. Discuss the factors that must be considered in selecting duct pipe, fittings, and insulation.
 - 2. Design and install duct pipe, fittings, and insulation.
- I. **Unit IX. System Cost Estimating**
 - 1. Use a cost estimating form to compute total cost of the equipment.
 - 2. Compute the labor cost of installing the equipment.

III. THECB Learning Outcomes (WECM)

- 1. Calculate heat loss and heat gain.
- 2. Size heating and cooling equipment to the structure.
- 3. Read and interpret detailed HVAC design plans.
- 4. Perform a load calculation using industry standards.
- 5. Design a complete air distribution system including ventilation requirements and indoor air quality.

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. Home Work Assignments

Students are required to turn in review questions at the end of each unit, of the textbook, upon completion of that unit. These grades will constitute 40% of the final grade.

C. Final Exam and Lab Exam

These exams will constitute 60% of the final grade.

D. 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.