

**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 1441</u>								
<b>COURSE TITLE</b>	<u>Residential Air Conditioning</u>								
<b>COURSE CREDIT HOURS</b>	<table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;"><b>4</b></td> <td style="width: 25%;"><b>3</b></td> <td style="width: 25%;"><b>:</b></td> <td style="width: 25%;"><b>3</b></td> </tr> <tr> <td><b>Credits</b></td> <td><b>Lec</b></td> <td></td> <td><b>Lab</b></td> </tr> </table>	<b>4</b>	<b>3</b>	<b>:</b>	<b>3</b>	<b>Credits</b>	<b>Lec</b>		<b>Lab</b>
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<b>Credits</b>	<b>Lec</b>		<b>Lab</b>						

**I. Catalog Description**

Studies components, applications, and installation of mechanical air conditioning systems including operating conditions, troubleshooting, repair, and charging of air conditioning systems. **(3:3). Lab fee.**

**II. Course Objectives**

- A. **Unit I. Domestic Refrigeration Fundamentals**
  - 1. Identify the different types of domestic refrigeration equipment and their basic components.
  - 2. Demonstrate the transportation and installation of refrigeration equipment.
  - 3. Make necessary leveling and cabinet adjustments.
  
- B. **Unit II. Sealed System**
  - 1. Identify the sealed system components of domestic refrigeration equipment and their basic components.
  - 2. List the functions of sealed system components.
  - 3. Diagnose and repair sealed system components.
  
- C. **Unit III. Domestic Refrigeration Defrost and Electrical Controls**
  - 1. List the function and identify defrost heaters.
  - 2. List the function and identify other types of heaters.
  - 3. Explain the purpose of electrical controls.
  - 4. List the different types of defrost system.
  - 5. Diagnose and repair defrost and electrical control failures.
  
- D. **Unit IV. Mechanical Servicing of Domestic Refrigerators**
  - 1. List the common mechanical system failures and show how to detect them.
  - 2. Replace or repair mechanical components.
  
- E. **Unit V. Troubleshooting Domestic Refrigerators**
  - 1. Diagnose and repair domestic refrigeration problems.
  - 2. Charge a system to manufacturers specifications.
  - 3. Service Domestic Refrigerators.
  - 4. Verify overall equipment performance.

- F. **Unit VI. Domestic Refrigerator Ice Makers**
1. Identify the different types of icemakers.
  2. List the problems of different types of icemakers.
  3. Identify water valves and their components.
  4. Install a refrigerator equipped with an ice maker.
  5. Troubleshoot and repair domestic refrigerator ice makers and associated components.
- G. **Unit VII. Fundamentals of Window Air Conditioners**
1. Describe the function of a window air conditioner.
  2. Identify window air conditioner parts.
  3. List electrical systems design characteristics, voltage, and amperage requirements.
  4. Identify window air conditioners from data plate information.
- H. **Unit VIII. Window Air Conditioner Repair**
1. Install a window air conditioner.
  2. Diagnose and repair different types of window air conditioners.
  3. Perform heat load calculations.
  4. Service window air conditioners.
  5. Verify overall equipment operation
  6. Describe service to customer
- I. **Unit IX. Gas Furnaces**
1. Identify different types of gas furnaces and their application.
  2. Identify the controls used in gas furnaces.
  3. Identify and repair gas furnaces.
  4. Install, inspect, and repair gas furnaces.
  5. Perform maintenance on gas furnaces.
  6. Isolate, remove, and replace heating components.
  7. Verify overall equipment performance
  8. Report unsafe equipment to the customer.
  9. Document equipment model and serial number.
  10. Evaluate work environment and correct unsafe conditions.
  11. Analyze delta T.
  12. Explain sequence of operations of a furnace.
  13. Perform gas leak and CO test.
  14. Identify fuel type and convert natural gas to propane (LP).
  15. Identify heat rise as per installation and operation manual (IOM).
- J. **Unit X. Electrical Heating Systems**
1. Identify the different types of electrical heating systems.
  2. Identify components of electrical heating systems.
  3. List common failures of electrical heating systems.
  4. Install, troubleshoot, and repair electrical heating systems.
  5. Verify overall equipment performance.
  6. Ensure proper rating of equipment for altitude.
  7. Perform natural gas-to-LP (liquid propane gas) conversions
  8. Verify proper venting.
  9. Verify CFM (cubic feet per minute) with delta temperature.
  10. Troubleshoot gas valves.
  11. Identify and troubleshoot four-way valves.
- K. **Unit XI. Residential Cooling Systems**
1. Identify the components of residential air conditioners.
  2. Describe the processes of the cooling cycle.
  3. Install, troubleshoot, and repair residential cooling systems.
  4. Service residential cooling systems.

5. Follow manufacturer's installation manual (IOM).
6. Distinguish Variable Refrigerant Volume (VRV) system.

**L. Unit XII. Other Professional Skills**

1. Demonstrate safe driving skills.
2. Avoid damaging customer's property.
3. Demonstrate courteous behavior.
4. Display professional appearance, apply multi-tasking skills, and perform proper housekeeping during and after job.
5. Resolve customer's complaint in a tactful manner.
6. Provide initial courtesy call, forecast arrival of parts or equipment for the job, and follow up with a courtesy call.
7. Maintain eye contact with customer and introduce yourself appropriately.
8. Demonstrate proper body language and empathy for the customers' situation.
9. Organize and inventory service vehicle.
10. Document problem accurately by writing legible reports and compile warranty information.

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

1. Identify various types of system applications.
2. Perform charging, recovery, and evacuation procedures of an installed system.
3. Perform component and part diagnostics and replacement.
4. Perform system maintenance.

**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 and Quizzes**

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

**C. Lab Assignments**

Will constitute 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.