

CATALOG INFORMATION

Dept and Nbr: APED 363      Title: APP PLUMBERS, HVAC, 4TH  
Full Title: Apprentice Plumbers, HVAC/Refrigeration, Fourth Semester  
Last Reviewed: 5/13/2024

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	18	Lecture Scheduled	54.00
Minimum	4.00	Lab Scheduled	3.00	8	Lab Scheduled	54.00
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	108.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 108.00

Total Student Learning Hours: 216.00

Title 5 Category: AA Degree Non-Applicable  
Grading: Grade Only  
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP  
Also Listed As:  
Formerly:

**Catalog Description:**  
Related supplemental instruction of heating, ventilation, air conditioning, and refrigeration for apprentice plumbers and pipefitters.

**Prerequisites/Corequisites:**

**Recommended Preparation:**

**Limits on Enrollment:**  
Indentured apprentice.

**Schedule of Classes Information:**  
Description: Related supplemental instruction of heating, ventilation, air conditioning, and refrigeration for apprentice plumbers and pipefitters. (Grade Only)  
Prerequisites/Corequisites:  
Recommended:  
Limits on Enrollment: Indentured apprentice.  
Transfer Credit:  
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	<b>Effective:</b>	<b>Inactive:</b>
<b>CSU GE:</b>	<b>Transfer Area</b>	<b>Effective:</b>	<b>Inactive:</b>

<b>IGETC:</b>	<b>Transfer Area</b>	<b>Effective:</b>	<b>Inactive:</b>
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<b>CSU Transfer:</b>	<b>Effective:</b>	<b>Inactive:</b>
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<b>UC Transfer:</b>	<b>Effective:</b>	<b>Inactive:</b>
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**CID:**

**Certificate/Major Applicable:**

Certificate Applicable Course

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Describe and demonstrate electrical/ plumbing principles and regulations related to heating, ventilation, air conditioning, and refrigeration trade.
2. Apply best practices in practical environment related to heating, ventilation, air conditioning, and refrigeration trade.

### **Objectives:**

At the conclusion of this course, the student should be able to:

1. Explain, discuss, define the process of certification in chlorofluorocarbons (CFC).
2. Demonstrate removal and recycling of CFC refrigerants.
3. Describe and demonstrate common trade related electrical controls.
4. Explain and demonstrate isometric drawing.

### **Topics and Scope:**

- I. Chlorofluorocarbons (CFC) Universal Certification
  - A. History of Environmental Protection Agency CFC regulations
  - B. Study Environmental Protection Agency regulations as they pertain to refrigerant storage and handling
  - C. Training in how to read and understand regulations
  - D. Preparation for certification exam
- II. Trade Related Electric Controls
  - A. Introduction to basic electric controls found in refrigeration.
  - B. Description of operation and functions of various electrical components
  - C. Training in proper testing and adjustments of controls
- III. Isometric Drawing
  - A. Fundamentals
  - B. 30 degree to 60 degree triangle
  - C. Scale rule
  - D. Simple rectangle drawing

- E. Cube drawing
- F. Elevations
- G. Piping drawing

All topics are covered in the lecture and lab portions of the course.

### Assignment:

#### Lecture-Related Assignments:

1. Written homework assignments (1 to 2 sets per week)
2. Project homework assignments (1 to 2 sets per week)
3. Weekly reading 10-15 pages
4. Quizzes and examinations (4 to 6 per semester)

#### Lab-Related Assignment:

5. Class performances and field work (on-the-job demonstrations) of skill development, safety practices, equipment, and material handling

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework assignments; field work

Problem solving  
10 - 25%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances; field work

Skill Demonstrations  
50 - 65%

**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes and examinations to include multiple choice, true/false, matching items, and completion

Exams  
10 - 20%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Attendance and participation

Other Category  
5 - 10%

### Representative Textbooks and Materials:

Drawing Interpretation & Plan Reading. International Pipe Trades Joint Training Committee.

2010 (classic)

Advanced Plan Reading & Related Drawing. International Pipe Trades Joint Training Committee. 2009 (classic)

Electric Controls for Mechanical Equipment Service. International Pipe Trades Joint Training Committee. 2009 (classic)

Air Conditioning. International Pipe Trades Joint Training Committee. 2008 (classic)