**APED 364 Course Outline as of Fall 2025**

# CATALOG INFORMATION

Dept and Nbr: APED 364 Title: APP PLUMBERS, HVAC, 5TH
Full Title: Apprentice Plumbers, HVAC/Refrigeration, Fifth 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

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|---|---|
| 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:**
Students will be introduced to training related to heating, ventilation, air conditioning (HVAC), and refrigeration for apprentice plumbers and pipefitters. This is the fifth semester of a ten-semester program.

**Prerequisites/Corequisites:**

**Recommended Preparation:**

**Limits on Enrollment:**
Indentured apprentice

**Schedule of Classes Information:**
Description: Students will be introduced to training related to heating, ventilation, air conditioning (HVAC), and refrigeration for apprentice plumbers and pipefitters. This is the fifth semester of a ten-semester program. (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:

| | | | |
|---|---|---|---|
| **AS Degree:** | **Area** | Effective: | Inactive: |
| **CSU GE:** | **Transfer Area** | Effective: | Inactive: |
| **IGETC:** | **Transfer Area** | Effective: | Inactive: |

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|---|---|---|
| **CSU Transfer:** | Effective: | Inactive: |
| **UC Transfer:** | Effective: | Inactive: |

**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 and plumbing principles and regulations related to heating, ventilation, air conditioning, and refrigeration trade
2. Apply best practices in the 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, demonstrate, use, and assess results of procedures for testing and analyzing refrigeration components.
2. Explain, demonstrate, use, and assess procedures for testing, analyzing, and troubleshooting HVAC systems.
3. Explain, compare, demonstrate, and use steam systems.

**Topics and Scope:**

I. Refrigeration Components
   A. Individual components in refrigeration systems
   B. Refrigeration system construction
   C. Theory of refrigeration system operation
   D. Interaction between heating and cooling systems
   E. Testing, troubleshooting, and repair of refrigeration components
   F. Testing, troubleshooting, and repair of refrigeration components with simulators
II. Testing and Theory of HVAC Systems
   A. Study and theory of HVAC systems
   B. Tools for troubleshooting and performance testing of HVAC systems
   C. Methods for troubleshooting HVAC systems
   D. Reference material and tables used to troubleshoot HVAC systems
   E. HVAC system troubleshooting simulators

III. Steam Systems
A. Theory of steam systems
B. Thermodynamics in steam systems
C. Basic components of steam systems
D. Steam system maintenance
E. Introduction to water treatment

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

**Assignment:**

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

Lab-Related Assignment:
1. 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.

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| None | Writing<br>0 - 0% |

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

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| Homework assignments; field work | Problem solving<br>10 - 25% |

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

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| Class performances; field work | Skill Demonstrations<br>50 - 65% |

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

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| Quizzes and examinations | Exams<br>10 - 20% |

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

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| Attendance and participation | Other Category<br>5 - 10% |

**Representative Textbooks and Materials:**
Steam Systems. International Pipe Trades Joint Training Committee. 2022.
Start, Test, & Balance. International Pipe Trades Joint Training Committee. 2022.
Conservation & Safe Handling of Refrigerants. International Pipe Trades Joint Training Committee. 2019. (classic).
Refrigeration. International Pipe Trades Joint Training Committee. 2020. (classic).