

APED 368 Course Outline as of Fall 2025**CATALOG INFORMATION**

Dept and Nbr: APED 368 Title: APP PLUMBERS, HVAC, 9TH
 Full Title: Apprentice Plumbers, HVAC/Refrigeration, Ninth 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:

Students will be introduced to training related to heating, ventilation, air conditioning (HVAC), and refrigeration for apprentice plumbers and pipefitters. This is the ninth 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 ninth 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:
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UC Transfer:	Effective:	Inactive:
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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 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, and analyze physical properties of water and steam in industrial applications
2. Explain, demonstrate, and analyze properties of hydraulic and pneumatic systems in industrial applications
3. Explain, demonstrate, analyze, and utilize theories and characteristics of metals, alloys, and synthetics in industrial application
4. Define, demonstrate, analyze, and apply thermodynamic terms, definitions, and formulas to industry-related practices and processes
5. Define, demonstrate, analyze, and apply psychrometric terms, definitions, and formulas to industry-related practices and processes

Topics and Scope:

I. Water and Steam

- A. Physical properties of water in industrial applications
- B. Physical properties of steam in industrial applications
- C. Flows and characteristics of water in machinery
- D. Flows and characteristics of steam in machinery

II. Hydraulic and Pneumatic Systems

- A. Hydraulic systems
- B. Pneumatic systems

- C. Testing of hydraulic systems
- D. Testing of pneumatic systems
- III. Metals, Alloys, and Synthetics
 - A. Industrial materials: metals, alloys, and synthetics
 - B. Corrosion by water and steam on industrial materials
- IV. Thermodynamics in Industrial Applications
 - A. Thermodynamic terms and symbols
 - B. Thermodynamic formulas and equations
 - C. Thermodynamic terms, symbols, and formulas in industrial applications
- V. Psychrometrics in Industrial Applications
 - A. Psychrometric terms and symbols
 - B. Psychrometric formulas, equations, and tables
 - C. Psychrometric terms, symbols, and formulas in industrial applications

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.

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

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:

Related Science. International Pipe Trades Joint Training Committee. 2018 (classic)

Hydraulic Heating & Cooling. International Pipe Trades Joint Training Committee. 2019 (classic)