

APPT 195: HYDRONICS/ STEAM SYSTEMS/PUMPS

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2021
Units:	5
Hours:	37 lecture, 86 laboratory per quarter (123 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Plumbing & Pipefitting Apprenticeship Program.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- A student will be able to identify risks associated with common process gases found in high purity piping installations.
- A student will be able to identify plastics used in high purity piping systems.
- A student will be able to describe water system passivation processes.

Description

Basic concepts of various heating and cooling systems. Equipment selection, pipe sizing, proper installation methods are taught. One-pipe steam systems will be compared to two-pipe systems. Pump selection and application as well as service and repair.

Course Objectives

The student will be able to:

- Describe principles of hydronic heating and cooling
- Identify types of hydronic systems
- Identify appropriate equipment and pipe sizes
- Describe the installation of equipment used
- Describe the properties of steam
- Describe how steam works in a heating system
- Compare the operation of the two-pipe system to the one-pipe system
- Identify the different types of heat transfer devices

Course Content

- Describe principles of hydronic heating and cooling
 - Advantages of hydronic heating and cooling
 - Gravity circulation
 - Forced circulation
- Identify types of systems
 - Series loop
 - One-pipe
 - Two-pipe

C. Identify the appropriate equipment and pipe sizing for hydronic systems

- Equipment layout
- Pipe sizing
- Compression tank sizing
- Air separator sizing
- Triple duty valves
- Suction diffusers

D. Describe the installation of the equipment used

- Pump installation techniques
- Compression tank
- Air separators
- Make-up water lines

E. Describe the properties of steam

- Steam and saturated steam
- Interpret and use the steam table

F. Describe how steam works in a heating system

- Explain how steam works
- Illustrate the use of steam traps

G. Compare the operation of the two-pipe system to the one-pipe system

- Differentiate between the one and two-pipe systems
- Describe the operation of the two-pipe system

H. Identify and compare the different types of heat transfer devices

- Identify common types of heat transfer units, controls and steam trapping
- Determine the appropriate methods for installing convectors and coils
- Identify unit heaters and proper mounting methods

Lab Content

Students will work individually and in teams on term project related to the operation, testing and repair of hydronic and steam systems.

Special Facilities and/or Equipment

Laboratory with hydronics and steam equipment.

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

- Results of written exercises and final examination
- Satisfactory completion of hand on projects
- Maintenance of a student workbook with questions drawn from text
- Group and classroom participation

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

- Lecture
- Lab assignment
- Group discussion
- Demonstration

Representative Text(s) and Other Materials

International Pipe Trades Joint Training Committee, Inc.. [Hydronics Heating and Cooling for United Association Journeyworkers & Apprentices](#). 2000.

International Pipe Trades Joint Training Committee, Inc.. Pumps - for United Association Journeyworkers & Apprentices. 2000.

International Pipe Trades Joint Training Committee, Inc.. Steam Systems. 2001.

Although one or more of these texts are older than the recommended 5 years they conform to national training standards and are considered seminal works in the discipline.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

- A. Reading from assigned textbooks
- B. Written assignments given in the laboratory
- 1. Quizzes from workbook lessons

Discipline(s)

Plumbing