

# APPT 132: P-102 APPLIED & RELATED THEORY

## Foothill College Course Outline of Record

Heading	Value
<b>Effective Term:</b>	Summer 2024
<b>Units:</b>	7
<b>Hours:</b>	72 lecture, 36 laboratory per quarter (108 total per quarter)
<b>Prerequisite:</b>	Per California Code of Regulations, this course is limited to students admitted to the Plumbing Technology Apprenticeship Program.
<b>Advisory:</b>	Not open to students with credit in APPR 102.
<b>Degree &amp; Credit Status:</b>	Degree-Applicable Credit Course
<b>Foothill GE:</b>	Non-GE
<b>Transferable:</b>	None
<b>Grade Type:</b>	Letter Grade (Request for Pass/No Pass)
<b>Repeatability:</b>	Not Repeatable

## Student Learning Outcomes

- A successful student will be able to Calculate piping off-sets.
- A successful student will be able to describe process required for sizing fuel gas piping.
- A successful student will be able to identify components of building drainage systems.

## Description

Review of basic math before introducing new concepts, including pipe measuring and calculation of simple offsets. Students learn fundamental scientific principles related to the installation and design of basic plumbing systems. Installation and design of fuel gas piping and drainage systems are also studied.

## Course Objectives

The student will be able to:

1. Perform basic mathematical calculations
2. Describe pipe measuring terms and their application
3. Demonstrate the use and application of piping formulas
4. Describe properties and characteristics of water and steam
5. Describe hydraulic and mechanical principles
6. Define differences between metals, alloys, and synthetics
7. Define characteristics of fuel gases
8. Define and identify fuel gas piping installations and materials
9. Describe public health benefits and parameters of sewage disposal
10. Explain basic design, layout, and installation of building drainage systems

## Course Content

1. Perform basic mathematical calculations
  - a. Numeric values
  - b. Addition, subtraction, multiplication, and division
  - c. Decimals and fractions
  - d. Square root
  - e. Convert decimal dimensions to feet and inches
2. Describe pipe measurements
  - a. Fitting nomenclature and measurements
  - b. Pipe measuring terms
  - c. Fitting take-off
  - d. Simple offsets
3. Demonstrate the use and application of piping formulas
  - a. Volume and areas
  - b. Grade and fall
4. Describe properties and characteristics of water and steam
  - a. States of matter
  - b. Pressure-temperature relationships
  - c. Steam saturation and condensation
5. Describe hydraulic and mechanical principals
  - a. Density and specific weights
  - b. Capillary action
  - c. Siphon action
  - d. Fluid flow
  - e. Definitions (force, power, work)
  - f. Mechanical advantage
6. Describe metals, alloys, and synthetics
  - a. Methods of joining synthetic materials
  - b. Expansion and contraction
  - c. Hazards and types of corrosion
7. Describe characteristics of fuel gases
  - a. Natural gas, propane
  - b. Combustion of fuel gases
  - c. Combustion triangle
  - d. Styles of fuel burners
8. Define and identify fuel gas piping installations and materials
  - a. Approved gas piping materials and appurtenances for gas service
  - b. Approved installation methods
  - c. Underground PE piping method
  - d. Identify testing methods and requirements
  - e. Calculate fuel gas pipe sizes
  - f. Discuss appliance installation and venting
  - g. Assemble fuel gas system piping
  - h. Recognize various fittings and specialty tools
  - i. Join polyethylene pipe
9. Describe public health benefits and parameters of sewage disposal
  - a. List principles of sewage treatment
  - b. List requirements for private sewage disposal systems
  - c. Discuss on-site sewage disposal, septic tanks
  - d. Wastewater treatment plants
10. Explain basic design, layout, and installation of building drainage systems

- a. Function of sewers and drains and basic system principles
- b. Identify components of building drainage systems
- c. Components and installation requirements for roof drains
- d. Use of plumbing traps
- e. Installation of different types of traps
- f. Principles of drainage system venting and various venting method
- g. Demonstrate proper vent sizing
- h. Sizing of sanitary drainage and vent piping systems
- i. Calculate drainage fixture units
- j. Sketch and design sanitary drainage and vent piping systems
- k. Install sanitary waste and vent piping system

## Lab Content

Students will work individually and in teams on safe practices for installing and maintaining plumbing waste and vent systems.

## Special Facilities and/or Equipment

1. Laboratory with plumbing tools.
2. Personal protective equipment.
3. When taught via Foothill Global Access, on-going access to computer with email software and hardware; email address.

## 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 hands-on projects  
Maintenance of a student's workbook with questions drawn from text

## 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.. Drainage Systems. 2016.

International Pipe Trades Joint Training Committee, Inc.. Gas Installations. 2016.

Ripka, L.V.. Plumbing Design and Installation, 4th ed.. 2012.

International Association of Plumbing and Mechanical Officials. 2016 California Plumbing Code, Title 24, Part 5. 2016.

International Pipe Trades Joint Training Committee, Inc.. Related Science. 2014.

International Pipe Trades Joint Training Committee, Inc.. Related Math. 2016.

Although these textbooks are older than 5 years, they are the most current books used when teaching this course. We will adopt the next edition of each text, as it is published.

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

1. Readings from assigned textbooks
  - a. Uniform Plumbing Code Book
  - b. Blueprints
  - c. Manufacturer's catalogs and websites
2. Writing assignments given in the laboratory
  - a. Sketch sanitary waste and vent system
  - b. Identify components and pipe sizing

## Discipline(s)

Plumbing