

APPT 128I: BEGINNING DRAWING & DESIGN

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Fall 2026
Units:	5
Hours:	36 lecture, 72 laboratory per quarter (108 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Plumbing Technology Apprenticeship Program.
Advisory:	Not open to students with credit in APPR 112 or APPT 133.
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

- By the end of this course, learners will be able to read and accurately interpret plumbing drawings, blueprints, and schematics to identify system layouts and components
- By the end of this course, learners will be able to create basic isometric drawings of plumbing systems using standard drafting symbols and plumbing layout

Description

This course introduces students in the Plumbing Service and Repair Apprenticeship to drawing fundamentals, with a focus on isometric drawing techniques used in the field. Students learn to properly design and size basic waste, water, and gas systems, with an in-depth study of residential water supply systems. The course also develops skills in reading and interpreting simple residential building plans, with an emphasis on designing and coordinating plumbing systems commonly encountered in service and repair work.

Course Objectives

The student will be able to:

1. List the design criteria for drainage and domestic water supply systems, both outside and within the building.
2. Properly design and size waste/vent, water, and gas systems for a typical residential or small commercial building.
3. Identify and demonstrate the use of common drawing tools used in plumbing design.
4. Interpret various residential building plans related to plumbing system layout and installation.
5. Produce accurate isometric drawings of waste, water, and gas systems for residential or small commercial applications.

Course Content

1. Plumbing system design principles
 - a. List the design criteria of drainage and domestic water supply systems, both outside and within the building
 - b. Principles of drainage system venting and various venting methods
 - c. Components of building drainage systems
 - d. Characteristics of water and potable water systems
 - e. Principles of water distribution systems
 - f. Water main and water service piping systems
 - g. Drain, waste, and vent (DWV) system design requirements
 - h. Water service and building water distribution system design requirements
 - i. Natural gas building distribution piping design
 - j. Discuss UPC Code requirements related to:
 - i. Drain, waste, and vent systems
 - ii. Cross-connection control
 - iii. Water heaters
 - iv. ADA requirements for fixture installation
2. System sizing and calculations
 - a. Properly design and size waste/vent, water, and gas systems for typical residential or small commercial buildings
 - b. Calculate fixture units for water and drainage systems
 - c. Perform building water distribution pipe sizing
 - d. Size sanitary drainage and vent piping systems
 - e. Size natural gas piping systems
 - f. Describe and draw a water sizing diagram
 - g. Create storm drain system drawings
 - h. Create interceptor design for commercial applications
3. Drafting tools and techniques
 - a. Identify and demonstrate the use of typical drawing tools
 - b. Identify and use common drafting tools
 - i. Pencil and lead types
 - ii. Architect's scale
 - iii. 30/60 and 45-degree drawing triangles
 - c. Comply with proper drafting protocols for lines and lettering
4. Reading and creating technical drawings
 - a. Interpret various residential building plans
 - b. Identify the importance of location when creating a three-view drawing
 - c. Demonstrate the correct method for arranging plan and elevation views
 - d. Identify and describe various plumbing symbols
 - e. Describe graphic symbols for pipe fittings and valves
 - f. Interpret technical drawings for proper installation of piping systems
 - g. Describe riser diagrams and their uses
5. Isometric and shop drawings
 - a. Introduction to isometric drawings
 - b. Rules for creating isometric drawings
 - c. Create isometric drawings of waste, water, and gas systems
 - d. Produce working isometric drawings for residential or small commercial applications

- e. Describe the purpose and features of shop drawings
- f. Describe the creation and detailing of shop drawings
- 6. Architectural specifications
 - a. Describe building plans and specifications
 - b. Interpret architectural and building specifications
- 7. ADA compliance
 - a. Interpret ADA requirements related to plumbing fixture installation
 - b. Create an ADA-compliant drawing for a water closet installation

Discipline(s)

Plumbing

Lab Content

Students will work individually and/or in groups on the design and drawing of a residential/commercial plumbing system.

Special Facilities and/or Equipment

- 1. Laboratory with drawing tools.
- 2. 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

Drawing/hands-on assignments

Group discussions

Demonstrations

Representative Text(s) and Other Materials

International Pipe Trades Joint Training Committee, Inc.. Drawing Interpretation and Plan Reading. 2015.

International Association of Plumbing and Mechanical Officials. Uniform Plumbing Code. 2022.

Although one of these textbooks is older than 5 years, it conforms to national training standards and is considered a seminal work in the discipline. We will adopt the next edition, as it is published.

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

- 1. Blueprints: reading and interpretation assignments
- 2. Manufacturers' catalogs and websites: research and reference reading
- 3. Handouts given in the laboratory: practical application exercises and written work
- 4. Create isometric drawings