

Course Code: PFT 113

Course Title: Pipes, Valves, and Fittings

Department: Applied Sciences and Technologies

Effective Date: Summer 2026

PCS Code: 1.2 - Occupational/Technical Instruction

CIP Code: 46.0503

Repeatability: 0

Credit Hours

Catalog Notation: 1-6-3

Credit Hour Distribution:

Lecture: 1

Lab: 6

Clinical: 0

Total: 3

General Course Information

Catalog Description

Pipes, connections, copper tubing, and plastics. Safety precautions and code requirements. Pipefitting, valves and hangers, basic piping measurements and calculations. Pipe-threading, soldering and brazing techniques. Hazardous chemical safety.

General Course Objectives

Students will be able to describe and properly demonstrate pipe-threading procedures, soldering, and brazing techniques.

Minimum Placement Levels

English

None

Reading

None

Math

None

Prerequisites

Admission into the Plumbers and Pipefitters Apprenticeship program

Methods of Evaluation

The minimum number of evaluation methods include 4 written and 4 practical exams.

Instructional Materials and Additional Supplies

Pipe Fittings, Valves, Supports, and Fasteners, International Pipe Trades Joint Training Committee (IPTJTC), Inc., 2005.

Soldering and Brazing, IPTJTC, 2006.

Course Content

General Learning Outcomes (GLOs)

- Technology: Students will demonstrate the ability to evaluate, select, and appropriately use current and emerging tools.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Cast Iron Pipe: a) Cutting, b) Connecting, and c) Code Requirements and Specifications	1. Cut and join cast iron pipe according to code requirements and specifications.	1	6	0
Steel Pipe: a) Cutting, b) Reaming, c) Manual and Power Threading, and d) Use of Abrasive Saw	1. Cut and ream steel pipe. 2. Thread steel pipe using manual or power tools.	1	6	0
Durham System: a) Identification of Fittings, b) Use of Fittings, c) Offsets - Use of Constants, d) Center-to-Center and End-to-End Measuring, e) Safety Applications in Installation, and f) Code Requirements	1. Identify types and uses of fittings in a Durham System. 2. Determine the offset for a piping system. 3. Measure fittings from center-to-center and end-to-end. 4. Describe the safety precautions to be followed when installing fittings. 5. Describe the code requirement for fittings installation.	1	6	0
Threading Large Pipes (2-1/2)	1. Safely thread large pipe using appropriate tools.	0.5	6	0
Pipe Connections: a) Threaded, b) Flanged, c) Welded, d) Right and Left Coupling, e) Caulder Coupling and Emergency Connector, and f) Code Requirements	1. Describe types of pipe connections meeting code requirements.	0.5	6	0
Copper Tubing: a) Cutting; b) Reaming; c) Connecting - 1. Soldering (50-50), 2. Soldering (95-5), 3. Silver Brazing, and 4. Soldering and Brazing Under Purge	1. Cut, ream, and connect copper tubing according to specifications. 2. Identify and describe the materials and equipment used in soldering and brazing. 3. Solder and braze copper tubing under purge.	1	6	0
Plastics: a) Installation Requirements; b) Use, Installation, and Solvent Cements; c) Types and Manufacturer's Specifications; and d) Code Requirements	1. Install various types of plastic pipe according to code and manufacturer's specifications.	1	6	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Pipe Formulas: a) Layout, b) Offsets, and c) Math Used in an Everyday Situation	1. Apply piping formulas to shop and field work.	1	6	0
Builder's Level-Transit and Lasers: a) History and Purpose, b) Terminology and Symbols, c) Basic Parts and Operation, d) Reading of Measuring Devices, e) Computation of Elevations, f) Layout and Staking for Elevations, and g) Layout of Underground Utilities for Excavations	1. Demonstrate use and care of builder's level and transit by laying out and staking above-ground and underground utilities.	1	6	0
Pipe, Fittings, and Valves: a) Identification - 1. Welded, 2. Flanged, 3. Threaded, 4. Glued, 5. Soldering and Brazing, and 6. Other Pipe Joining Methods; b) Installation; and c) Use in the Field	1. Demonstrate basic pipe joining methods. 2. Describe their use in the field.	1	6	0
Hangers, Supports, Inserts, and Anchors: a) Identification of Types, b) Installation, and c) Use in the Field	1. Identify and describe the use of basic types of hangers, supports, inserts, and anchors. 2. Demonstrate the installation of hangers, supports, inserts, and anchors.	1	6	0
Operation of Pipe Machines: a) Automatic Threading Machines, b) Power Heads and Portable Power Drives, and c) Portable Threading Machines	1. Safely operate and maintain automatic and portable threading machines, power heads, and portable power drives.	1	6	0
Basic Piping Math Measures: a) Use of Ruler and Tape Measure, b) Measurements from Drawings, c) Builder's Level and Transit, d) Use of Fractions, and e) Piping Offsets	1. Take accurate measurements for piping installations. 2. Determine a piping offset within a piping system. 3. Apply fractions to calculate screwed pipe installations.	1	6	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Soldering and Silver Brazing; a) Introduction - 1. History and Purpose and 2. Terminology; b) Composition of Copper - 1. Classes and Sizes and 2. Methods of Joining Copper; c) Fluxes - 1. Capillary Action and 2. Soldering and Brazing; d) Filler Metals; e) Types of Equipment - 1. Electric, 2. Natural Gas, 3. Butane, 4. Propane, and 5. Oxy-acetylene; f) Joint Preparation; g) Soldering Procedures; h) Brazing Procedures; i) Swage Fitting; j) Brazable Metals; and k) Soldering and Brazing Positions	1. Review the steps involved in joint preparation, soldering, and brazing procedures.	1	6	0
Chemical Safety: a) Definition of Terms; b) Recognizing Hazardous Chemicals - 1. Containers, 2. Odors, and 3. Appearance; c) Interpreting Information - 1. Labels, 2. Signs, and 3. Symbols; d) Nature of Dangerous Substances - 1. Chemicals, 2. Gases, and 3. Solvents; e) Safe Handling Techniques; f) Emergency Procedures, and g) Resources for Additional Information	1. Given sample situations involving hazardous chemicals, describe the dangers involved and the appropriate safety precautions. 2. Describe special emergency procedures that apply to hazardous chemicals.	2	6	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
15	90	0