ATPL-1240: UNDERGROUND PLUMBING SYSTEMS; APPLICATION AND INSTALLATION

Cuyahoga Community College

Viewing: ATPL-1240 : Underground Plumbing Systems; Application and Installation

Board of Trustees:
September 2025

Academic Term:
Fall 2025

Subject Code
ATPL - Applied Ind Tech - Plumbers

Course Number:
1240

Title:
Underground Plumbing Systems; Application and Installation

Catalog Description:
Advanced course covering the application and installation of underground plumbing systems including safety requirements. Also covered are installation techniques, applied math, construction tools and equipment and interpretation of mechanical drawings.

Credit Hour(s):
2

Lecture Hour(s):
2

Requisites

Prerequisite and Corequisite
Departmental approval: admission to Plumbing Technology apprenticeship program.

Outcomes

Course Outcome(s):
Discuss the applications of underground plumbing systems and identify the different types of pipe.

Objective(s):
1. Identify the applications of underground plumbing systems used in the residential, commercial and industrial industries.
2. Explain how the different types of pipe are manufactured and discuss the importance of quality control.
3. List the different types of fittings used to join the different types of pipe.
4. Identify the various vertical and horizontal supports needed.
5. Review the Ohio Plumbing Code relative to the installation and venting of underground plumbing systems.

Course Outcome(s):
Discuss the safety procedures as prescribed by the Occupational Safety and Health Administration (OSHA) and related industry safety standards.

Objective(s):
1. Identify the hazards related to working underground.
2. Discuss the procedures used to protect the worker and building during underground installations.
3. List the Personal Protection Equipment (PPE) as prescribed by OSHA required for safe installations.
4. Explain how gases and contamination in the earth can harm or cause death.

Course Outcome(s):

Interpret mechanical drawings and schematics and review related math concepts for material estimating, layout procedures and pipe locations.

Objective(s):

1. Identify underground requirements on mechanical drawings.
2. Differentiate between mechanical drawings and schematics.
3. Determine pipe locations in floors, walls and ceilings from floor plans and specifications.
4. Estimate quantities of pipe and pipe fittings required for mechanical installations.
5. Establish different lists required for materials, tools and equipment.
6. Review trade related math concepts necessary for pipe layout and to install underground plumbing systems.

Course Outcome(s):

Follow procedures for locating mechanical requirements for residential and commercial structures.

Objective(s):

1. Locate the work area and position the materials and tools required for mechanical installations.
2. Lay out locations of respective underground plumbing systems using applied math and geometry.
3. Select proper hand and power tools and safely operate to perform installations.
4. Employ safety precautions as prescribed by OSHA and other related industry safety standards.

Methods of Evaluation:

1. Homework
2. Quizzes
3. Shop Exams
4. Final Exams

Course Content Outline:

1. Applications and Pipe
    a. Residential
        i. Drainage systems
        ii. Sewer
        iii. Venting
    b. Commercial
        i. Drainage
        ii. Storm
        iii. Sewer
        iv. Venting
    c. Pipe Manufacturing
        i. Seamless
        ii. Rolled
        iii. Composition of materials
    d. Fittings
        i. Wyes
        ii. Sanitary tees
        iii. Bends
    e. Suspension
        i. Supports
        ii. Hangers
        iii. Clamps
        iv. Fasteners
    f. Code standards

i. Venting
ii. Drainage
iii. Storm

2. Safety procedures
   a. Id hazards
      i. Fires
      ii. Abrasions
      iii. Burns
      iv. Physical strains
   b. Procedures for protection of worker(s)
      i. Pre task safety meetings
      ii. Knowing the safety procedures of job site and employer
      iii. Understanding OSHA regulations
   c. PPE – ID and use
      i. Fire proof/heat resistance materials
      ii. Proper body, foot and hand protection
      iii. Eye and face protection
   d. Respiratory risks
      i. Breathing air
      ii. Environmental
      iii. Protection
3. Material, layout and locations
   a. Id supply and waste on drawings
      i. Code requirements
      ii. Interpret water and waste lines
      iii. Understanding what drawings to look at
   b. Mechanical drawings vs. schematics
      i. What is on mechanical drawings
      ii. What is lacking on mechanical drawings
      iii. Types of schematics
      iv. Schematic use in the installation process
   c. Determine locations of pipes
      i. Understanding floor plans
      ii. Using the correct revisions
      iii. Measurements from common locations
      iv. Understanding job specifications
   d. Estimate quantities
      i. What is estimating
      ii. How to estimate from drawings and specifications
      iii. Common procedures
   e. Making lists
      i. Tools
      ii. Safety
      iii. Equipment
      iv. Materials
   f. Review of trade related math
      i. Types of measurements
      ii. Geometry related to the installs
      iii. Using math for quick lay outs
4. Installations for residential and commercial
   a. Location, tools and materials required
      i. Locate area of installation
      ii. Stage tools required
      iii. Gather materials
      iv. Check PPE
   b. Layout locations using math
      i. Drawings for layout
      ii. Demonstrate use of applied geometry math
      iii. Waste vs. water supply layouts

c. Selection of tools
   i. Safe tool usage
   ii. Tool select
d. Use of proper safety equipment
   i. PPE
   ii. Jobsite and employer safety regulations
   iii. Worker safety

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

Resources for the Instructor

Alfred Steel . *Engineered Plumbing Design*. Construction Industry Press, Elmhurst IL., 1982.

United Association . *Drainage*. 3rd ed . Annapolis, MD,

United Association Training Department . *Soldering and Brazing Manual*.

Related Mathematics . I.P.C.J.T.C., 2002.

2007 Ohio Plumbing Code . 1st. International Code Council, Inc., 2006.

Additional Resources for the Instructor

1. www.copper.org
2. www.kpsec.freeuk.com/solder.htm
3. www.brazing.com/
4. Our pipe fitting book
5. Cast iron/PVC book
6. Shop drawings, assorted manufacturers recommended literature
7. 2011 Plumbers Local #55 PowerPoint's and Developed Length Diagrams

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