Plumbing Apprenticeship
Year 1
Idaho State Division of Professional Technical Education
Revised June 2011

Total Suggested Hours - 168
Each of the following subjects may take more or less time than is shown, but a minimum of 144 hours is required.

Introduction to the Plumbing Profession - 6 hours

- History of the Plumbing Profession
- Idaho State Plumbing Structure
- Basic Principles of Plumbing

Objectives:
- Describe the history of the plumbing profession
- Identify the state of Idaho’s organizational structure
- Identify the basic principles on which the plumbing code is based

Plumbing Safety – 18 hours

- Basic Safety
- OSHA
- Lifting
- Ladder
- Fire
- Personal Protective Equipment
- Trench
- Lock out /tag out
- Confined Space

Objectives:
- Understand common unsafe acts and conditions that cause accidents and how to handle these situations to make them safer
- Identify job site hazards – work specific to plumbers
- Learn how to maintain your workplace safely
- Understand OSHA’s involvement in the plumbing profession
- Understand how the cost of accidents and illnesses effect everyone on a job site
- Identify how to properly lift heavy objects to avoid injury
- Identify the proper procedures to safely work on and around ladders
- Identify the different types of fires and the proper extinguisher to use for each type
- Identify the types of personal protective equipment needed in the plumbing profession and when each type is required
- Understand how to work safely in and around a trench
- Understand the lock out/ tag out procedure
- Understand how to properly work in and around a confined space
Introduction into Hand Tools used in the Plumbing Profession - 6 hours

- Levels
- Tape Measure
- Screw Drivers
- Wrenches
- Plastic Pipe Cutter
- Saws
- Pliers
- Torch regulator assembly

Objectives:
- Identify the types of hand tools used in the plumbing profession
- Learn how to properly use and care for basic hand tools
- Visually inspect hand tools to determine if they are safe to use
- Identify the types of personal protective equipment required to be used with hand tools

Introduction into Power Tools used in the Plumbing Profession – 6 hours

- Power Drills
- Drill Bits
- Power Saws
- Air Compressor
- Pneumatic Tools
- Jack Hammers

Objectives:
- Identify the types of power tools used in the plumbing profession
- Learn how to properly use and care for basic power tools
- Identify which drill or saw is used relevant to the work location
- Identify which drill bit or saw blade is used relevant to a system installation
- Visually inspect power tools to determine if they are safe to use
- Identify the types of personal protective equipment required to be used with power tools

Identification of All Plumbing Fittings and Types of Pipe - 6 hours

Objectives:
- Identify and describe the various fittings used in the plumbing profession
- Understand that certain fitting materials and designs may only be used for specific systems
- Describe the relationship of fitting design selections and plumbing codes
- Identify and describe common types of pipes used in the plumbing profession
- Understand that certain types of pipes may only be used for specific systems
- Describe the relationship of pipe design selections and plumbing codes

Mathematics – 30 hours

- Review of Basic Math Fundamentals
- Area
- Volume
- Weight/Gallons of liquids
Objectives:
  o Define the kinds of measurements used
  o Demonstrate how to use a calculator to solve plumbing math
  o Define the basic concepts to solve story problems.
  o Demonstrate the use of a standard ruler and tape measure
  o Recognize some of the basic shapes used in the plumbing industry and demonstrate basic geometry to measure them
  o Solve problems for area and volume using appropriate formulas.
  o Solve problems relating to area, volume, weights and gallons

Introduction to the Uniform Plumbing Code – 39 hours

  • General Regulations
  • Water System
  • Drain, Waste and Vent System

Objectives:
  o Apply general regulations related to water systems and drain, waste and vent systems
  o Perform water pipe sizing exercises
  o Describe the code requirements for the installation of water supply and distribution systems (materials, joints, connections, sizing, etc)
  o Describe the code requirements for the installation of drain and waste systems (materials, joints, connections, sizing, etc)
  o Perform drain and waste pipe sizing exercises

Isometric Drawings – 15 hours

  • Plumbing Symbols and Abbreviations
  • Three dimensional drawing

Objectives:
  o Identify the various plumbing symbols and abbreviations used on a blueprint drawing

Lab – 42 hours - For those schools with a lab, these hours may be completed entirely in a lab setting. For those who do not, the instructor should make every attempt to use a company’s space & equipment or the instructors may explain through lecture and demonstration.

  • Plumbing Repairs and Troubleshooting
  • Plumbing lay out for single bathroom group

Objectives:
  o Identify and repair various plumbing fixtures needed in a bathroom group
  o Given a plan view of a bathroom group, demonstrate the following:
    ▪ Create an isometric drawing
    ▪ Lay out the bathroom group in the lab
    ▪ Plumb the bathroom group using fittings and piping to minimum standards of the UPC
Plumbing Apprenticeship
Year 2
Idaho State Division of Professional Technical Education
Revised June 2011

Total Suggested Hours - 168
Each of the following subjects may take more or less time than is shown, but a minimum of 144 hours is required.

Interpretation and Application of the Uniform Plumbing Code and Idaho Statutes Title 54 - Chapter 26 – Plumbing and Plumbers
74 Hours
- Administration and Idaho Title 54
- General Regulations
- Plumbing Fixtures and Fixture Fittings
- Water Supply and Distribution
- Sanitary Drainage
- Building Sewers
- Indirect Wastes
- Vents
- Traps

Objectives:
- Identify the Uniform Plumbing Code and Idaho Law administrative and enforcements rules
- Explain when the general regulations apply to various parts of the plumbing system (water, drainage, venting, etc.)
- Describe how plumbing fixtures are roughed-in and installed
- Perform water pipe sizing exercises
- Describe the code requirements for the installation of water supply and distribution systems (materials, joints, connections, sizing, etc)
- Describe the code requirements for the installation of drain and waste systems (materials, joints, connections, sizing, etc)
- Perform drain and waste pipe sizing exercises
- Describe the code requirements for the installation of public and private building sewers
- Identify and install an indirect waste system
- Describe the code requirements for the installation of the vent systems (materials, joints, connections, sizing, etc)
- Perform vent pipe sizing exercises
- Describe where traps are required in the plumbing system

Understanding Blueprint Drawings – 24 hours
- Plumbing Symbols and Abbreviations
- Drain, Waste and Vent System Drawings
- Water Distribution System Drawings
- Drain, Waste and Vent System Material List
- Water Distribution System Material List

Objectives:
- Identify the various plumbing symbols and abbreviations used on a blueprint drawing
Given various residential blueprint drawings. The student will complete to minimum UPC standards the following:

- Identify various parts of the plumbing system
- Isometrically draw the drain, waste and vent system
- Isometrically draw the water distribution system
- Make a material list for the drain, waste and vent system
- Make a material list for the water distribution system

**Safety – 12 hours**
- Recognizing safe and unsafe working conditions in the work place environment

**Objectives:**
- Given various job site situations, explain proper safety procedures

**Math Applications – 18 hours**
- Review Area and Volume
- Elevation and Grade
- Pressure
- Standard Weight Pipe
- Allowances for Threaded, Copper and Plastic Fittings
- Equal Spacing
- Various Angles in Plumbing

**Objectives:**
- Calculate area for various geometric shapes
- Calculate water volumes, weights, and gallons for various geometric shapes
- Define Elevation and Benchmark
- Calculate Elevations
- Calculate pressure from height of water
- Recognize different pipe weights
- Calculate end-to-end and center-to-center measurements for threaded, copper and plastic fittings
- Compare the bend or fitting angle to a circle

**Lab – 40 hours** - For those schools with a lab, these hours may be completed entirely in a lab setting. For those who do not, the instructor should make every attempt to use a company's space & equipment or the instructors may explain through lecture and demonstration.

- Plumbing Fixtures
- Lav, Water Closet and Urinal Carriers
- Various plumbing systems

**Objectives:**
- Investigate the various parts of plumbing fixtures by disassembling and assembling
- Assemble and set fixtures on carriers
- Given a drawing, assemble various types of plumbing systems using ABS and PVC pipe and fittings (example: wet vents, island fixture vents, DWV systems, etc)
Plumbing Apprenticeship
Year 3
Idaho State Division of Professional Technical Education
Revised June 2011

Total Suggested Hours - 168
Each of the following subjects may take more or less time than is shown, but a minimum of 144 hours is required.

Interpretation and Application of the Uniform Plumbing Code and Idaho Statutes Title 54 -
Chapter 26 – Plumbing and Plumbers - 60 Hours

- Administration and Idaho Title 54
- General Regulations
- Plumbing Fixtures and Fixture Fittings
- Water Heaters
- Water Supply and Distribution
- Sanitary Drainage
- Building Sewers
- Indirect Wastes
- Vents
- Traps and Interceptors
- Strom Drainage
- Fuel Piping
- Fire Stop Protection

Objectives:
- Identify the Uniform Plumbing Code that pertain to the above list.
- Explain Idaho Law administrative and enforcements rules
- Explain when the general regulations apply to various parts of the plumbing system (water, drainage, venting, etc.)
- Describe how plumbing fixtures are roughed-in and installed
- Explain the rules governing installation of water heaters
- Perform water pipe sizing exercises
- Describe the code requirements for the installation of water supply and distribution systems (materials, joints, connections, sizing, etc)
- Explain when and what type of backflow prevention devices, assemblies, and methods are required
- Describe the code requirements for the installation of drain and waste systems (materials, joints, connections, sizing, etc)
- Perform drain and waste pipe sizing exercises
- Describe the code requirements for the installation of public and private building sewers
- Identify and install an indirect waste system
- Describe the code requirements for the installation of the vent systems (materials, joints, connections, sizing, etc)
- Perform vent pipe sizing exercises
o Describe where traps are required in the plumbing system
o Identify and install an interceptor
o Describe the code requirements for the installation of storm drainage systems (materials, joints, connections, sizing, etc)
o Perform storm drainage pipe sizing exercises
o Describe the code requirements for the installation of fuel pipe systems (materials, joints, connections, sizing, etc)
o Perform fuel pipe sizing exercises
o Explain the general requirements for fire stop protection

**Commercial Blueprint Reading (Fairmont Park Elementary) - 42 hours**
- Introduction to Commercial Blueprints
- Basic Plumbing Symbols and Abbreviations
- Spec Book relationship to the plan
- Plumbing Rough-in
- Plumbing Fixtures
- Coordinate with other construction trades on the job

**Objectives:**
- Understand the Different Illustrated Views of a building
- Understand Basic Plumbing Symbols and Abbreviations
- Describe how the Spec Book relates to the plan
- Identify the requirements necessary for the rough in of the drain, waste, and vent system, water supply and distribution system, gas piping system, etc.
- Identify the necessary requirements and locations to properly install the plumbing fixtures and plumbing appurtenances
- Identify the reasons for coordination of trades on the job site

**ADA Guidelines - 8 hours**
- ADA Guidelines related to plumbing

**Objectives:**
- Identify and describe the necessary requirements to plumb according to ADA standards

**Math Applications - 18 Hours**
- Jumper Offsets
- Offsets in Parallel
- Rolling Offsets
- Cast Iron Assemblies with Various Bends
- Review of Area and Volume

**Objectives:**
- Describe a jumper offset
- Determine center-to-center and end-to-end lengths for parallel offsets
- Visualize a rolling offset
- Calculate the travel for a rolling offset
- Solve for e-e lengths of cast iron pipe
- Calculate area, water volumes, weights, and gallons for various geometric shapes

**Lab** - 40 hours
For those schools with a lab, these hours may be completed entirely in a lab setting. For those who do not, the instructor should make every attempt to use a company's space & equipment or the instructors may explain through lecture and demonstration.

- ADA bathroom groupings
- Cast Iron No hub Rough-in

**Objectives:**

- Layout lavs, water closets, tubs, kitchen sinks according to ADA requirements
- Given various bathroom blueprint layouts – rough in using cast iron no hub pipe and fittings
Plumbing Apprenticeship
Year 4
Idaho State Division of Professional Technical Education
Revised June 2011

Total Suggested Hours - 168
Each of the following subjects may take more or less time than is shown, but a minimum of 144 hours is required.

Interpretation and Application of the Uniform Plumbing Code and Idaho Statutes Title 54, Chapter 26: Plumbing and Plumbers – 123 hours

- Administration and Idaho Title 54
- General Regulations
- Plumbing Fixtures and Fixture Fittings
- Water Heaters
- Water Supply and Distribution
- Sanitary Drainage
- Building Sewers
- Indirect Wastes
- Vents
- Traps and Interceptors
- Storm Drainage
- Fuel Piping
- Fire Stop Protection

Objectives:
- Identify the codes pertaining to the above list from the Uniform Plumbing Code
- Describe Idaho Law administrative and enforcements rules
- Explain when the general regulations apply to various parts of the plumbing system (water, drainage, venting, etc.)
- Describe how plumbing fixtures are roughed-in and installed
- Explain the rules governing installation of water heaters
- Perform water pipe sizing exercises
- Describe the code requirements for the installation of water supply and distribution systems (materials, joints, connections, sizing, etc)
- Explain when and what type of backflow prevention devices, assemblies, and methods are required
- Describe the code requirements for the installation of drain and waste systems (materials, joints, connections, sizing, etc)
- Perform drain and waste pipe sizing exercises
- Describe the code requirements for the installation of public and private building sewers
- Identify and install an indirect waste system in a lab.
- Describe the code requirements for the installation of the vent systems (materials, joints, connections, sizing, etc)
- Perform vent pipe sizing exercises
- Describe where traps are required in the plumbing system
Identify and install an interceptor in a lab.
- Describe the code requirements for the installation of storm drainage systems (materials, joints, connections, sizing, etc)
- Perform storm drainage pipe sizing exercises
- Describe the code requirements for the installation of fuel pipe systems (materials, joints, connections, sizing, etc)
- Perform fuel pipe sizing exercises
- Explain the general requirements for fire stop protection

**Isometric Drawings and Material Lists – 21 hours**
- Drain, Waste and Vent System Drawing
- Water Distribution System Drawing
- Drain, Waste and Vent System Material List
- Water Distribution System Material List
- Trim Material List

**Objectives:**
- Given a set of residential blueprint drawings (example: residence on plumbing street). The student will complete to minimum UPC standards the following:
  - Isometrically draw the drain, waste and vent system
  - Isometrically draw the water distribution system
  - Create a material list for the drain, waste and vent system
  - Create a material list for the water distribution system
  - Create a material list of the plumbing fixtures and trim

**Safety – 6 hours**
- Recognizing safe and unsafe working conditions in the work place environment

**Objectives:**
- Give examples of direct and indirect costs of workplace accidents
- Identify safety hazards of the construction industry

**Math Applications – 18 hours**
- Area
- Volume
- Pressures

**Objectives:**
- Calculate area for various geometric shapes
- Calculate water volumes, weights, and gallons for various geometric shapes
- Calculate pressure from height of water