



## Plumbing Apprenticeship - CURRICULUM

The following is a brief description of subjects contained in all four levels of the plumbing program as well as the core curricula that all level one students are expected to pass prior to entering a class.

This curriculum is for plumbing apprentices and assumes you are already employed by a plumbing firm!

### **CORE CURRICULUM - 72.5 / 80 Hours**

The core curricula provides a basic introduction to construction work for all crafts. **The CORE CURRICULUM is an internet-based self-study course and is not taught in the classroom like Plumbing levels 1-4.**

- **Basic Safety**

Explains the safety obligations of workers, supervisors, and managers to ensure a safe workplace. Discusses the causes and results of accidents and the dangers of rationalizing risk. Reviews the role of company policies and OSHA regulations in maintaining a safe workplace. Introduces common job-site hazards and protections such as lockout/tagout, personal protective equipment (PPE), and HazCom.

- **Introduction to Construction Math**

Reviews basic mathematical functions such as adding, subtracting, dividing, and multiplying whole numbers, fraction, and decimals, and explains their applications to the construction trades. Explains decimal-fraction conversions and the metric system using practical examples. Also reviews basic geometry as applied to common shapes and forms.

- **Introduction to Hand Tools**

Introduces trainees to hand tools that are widely used in the construction industry, such as hammers, saws, levels, pullers, vises and clamps. Explains the specific applications of each tool and shows how to use them properly. Also discusses important safety and maintenance issues related to hand tools.

- **Introduction to Power Tools**

Provides detailed descriptions of commonly used power tools such as drills, saws, grinders, and sanders. Reviews applications, proper use, safety, and maintenance. Many illustrations show power tools used in on-the-job settings.

- **Introduction to Construction Drawings**

Covers construction drawings, components, and symbols. Discusses different types of drawings and describes how to interpret and use drawing dimensions.

- **Basic Rigging**

Explains how ropes, chains, hoists, loaders, and cranes are used to move material and equipment from one location to another on a job site. Describes inspection techniques and load-handling safety practices. Also reviews American National Standards Institutes (ANSI) hand signals.

- **Basic Communication Skills**

Provides trainees with techniques for communicating effectively with co-workers and supervisors. Includes practical examples that emphasize the importance of verbal and written information and instructions on the job. Also discusses effective telephone and e-mail communication skills.

- **Basic Employability Skills**

Identifies the roles of individuals and companies in the construction industry. Introduces trainees to critical thinking and problem solving skills and computer systems and their industry applications. Also review effective relationship skills, effective self-presentation, and key workplace issuers such as sexual harassment, stress, and substance abuse.

### **PLUMBING LEVEL ONE - 145 / 160 Hrs**

- **Introduction to the Plumbing Profession - 5 / 8 Hrs**



Introduces the trainee to many career options available in today's plumbing profession. Provides a history of plumbing and also discusses the current technology, industries, and associations that make up the modern plumbing profession. Also reviews human relations and safety skills.

- **Plumbing Safety - 22.5 / 27 Hrs**

Discusses the causes of accidents and their consequences and repercussions in terms of delays, increased expenses, injury, and loss of life. Reviews the types and proper use of personal protective equipment (PPE). Instructs trainees in the use of critical safety information conveyed in hazard communication (HazCom), safety signs, signal, lockout/tagout, and emergency response. Covers confined space safety, and reviews safety issues related to hand and power tools.

- **Tools of the Plumbing Trade - 10 / 12 Hrs**

Instructs trainees in the care and use of the different types of hand and power tools they will use on the job. Gives trainees the information they need to select the appropriate tools for different tasks, and reviews tool maintenance and safety issues.

- **Introduction to Plumbing Math - 12.5 / 15 Hrs**

Review basic math concepts, such as whole numbers, fractions, decimals, and squares, and demonstrates how they apply to on-the-job situations. Teaches trainees how to measure pipe using fitting tables and framing squares and how to measure pipe using fitting tables and framing squares and how to calculate 45-degree offsets.

- **Introduction to Plumbing Drawings - 17.5 / 20 Hrs**

Introduces trainees to the different types of plumbing drawings they will encounter in the job, and discusses how to interpret and apply them when laying out and installing plumbing systems. Discusses the symbols used in plumbing and mechanical drawings and reviews isometric, oblique, orthographic, as well as schematic drawings. Requires trainees to render plumbing drawings and recognize how code requirements apply to plumbing drawings.

- **Basic Communication - 24 Hrs**

Introduces trainees to team, customer, & job-related communication. From notes, to writing professionally 7 legally sound letters.

- **Plastic Pipe and Fittings - 12.5 / 17 Hrs**

Introduces trainees to the different types of plastic pipe and fittings used in plumbing applications, including ABS, PVC, CPVC, PE, PEX, and PB. Describes how to measure, cut, join, and support plastic pipe according to manufacturer's instruction and applicable codes. Also discusses pressure testing of plastic pipe once installed.

- **Copper Pipe and Fittings - 12.5 / 17 Hrs**

Discusses sizing, labeling, and applications of copper pipe and fittings, and reviews the type of valves that can be used on copper pipe systems. Explains proper methods for cutting, joining, and installing copper pipe. Also addresses insulation, pressure testing, seismic codes, and handling storage requirements.

- **Cast-Iron Pipe and Fittings - 12.5 / 17 Hrs**

Introduces trainees to hub-and-spigot and no-hub cast-iron pipe and fittings and their applications in the DWV systems. Reviews material properties, storage and handling requirements, and fittings and valves. Covers joining methods, installation, and testing.

- **Carbon Steel Pipe and Fittings - 12.5 / 17 Hrs**

Discusses threading, labeling, and sizing of steel pipe, and reviews the differences between domestic and imported pipe. Covers the proper techniques for measuring, cutting, threading, joining, and hanging steel pipe. Also reviews corrugated stainless steel tubing.

- **Introduction to Plumbing Fixtures - 7.5 Hrs**

Discusses the proper applications of code-approved fixtures and faucets in plumbing installations. Reviews the different types of fixtures and faucets and the materials used in them. Also covers storage, handling, and code requirements.



- **Introduction to Drain, Waste, and Vent (DWV) Systems - 10 Hrs**

Explains how DWV systems remove waste safely and effectively. Discusses how system compactness, such as pipe, drains, traps, and vents, work. Reviews drain and vent sizing, grade, and waste treatment. Also discusses how building sewers and sewers drains connect the DWV system to the public sewer system.

- **Introduction to Water Distributions Systems- 10 Hrs**

Identifies the major components of water distribution systems, and describes their functions. Reviews water sources and treatment methods, and covers supply and distribution for the different types of the systems that trainees will install on the job.

## **PLUMBING LEVEL TWO - 175 / 240 Hrs**

- **Plumbing Math - 15 / 20 Hrs**

Explains the Pythagorean theorem and reviews methods for finding angles. Discusses the techniques used to calculate simple and rolling offsets on parallel runs of pipe.

- **Reading Commercial Drawings - 25 / 30 Hrs**

Teaches trainees how to interpret and use civil, architectural, structural, mechanical, plumbing, and electrical drawings when installing plumbing systems. Covers how to create and use isometric drawings, material takeoffs and approved submittal data.

- **Structural Penetrations, Insulation, and Fire-Stopping - 15 / 20 Hrs**

Introduces methods for adjusting structural members, insulating pipe, and installing fire-stopping. Covers reinforcement techniques for modified structural members; how to measure, cut and install fiberglass and flexible foam insulation; and how to identify walls, floors, and ceilings that require fire-stopping.

- **Installing and Testing DWV Piping - 30 / 35 Hrs**

Explains how to locate, install, connect, and test a complete drain, waste, and vent (DWV) system.

- **Installing Roof, Floor, and Area Drains - 5 / 8 Hrs**

Covers the proper techniques for locating, installing, and connecting roof, floor, and area drains according to code. Also discusses waterproof membranes and flashing, drain components, and proper drain applications.

- **Types of Valves - 5 / 8 Hrs**

Reviews the many types and uses of valves, their components, and valve applications. Also covers valve repairs and replacement.

- **Installing and Testing Water Supply Piping - 30 / 35 Hrs**

Explores the proper techniques for locating, installing, and testing complete water supply systems, including piping, meters, water heaters, water softeners, and hose bibbs. Reviews common code requirements for water supply systems.

- **Installing Fixtures, Valves, and Faucets - 20 / 25 Hrs**

Covers the installation of basic plumbing fixtures, including bathtubs, shower stalls, lavatories, sinks, water closets, and urinals. Also reviews the installation of associated valves, faucets, and components.

- **Basic Electricity - 10 / 15 Hrs**

Introduces trainees to the principles of electricity, including voltage, current, resistance, and power. Includes important electrical formulas, circuitry, and common plumbing-related electrical applications.

- **Installing Water Heaters - 10 / 15 Hrs**

Discusses gas-fired, electric, solar, instantaneous, and indirect water heaters, components, and applications. Reviews proper installation and testing techniques and covers the latest federal guidelines that apply to water heaters.

- **Fuel Gas Systems - 20 / 25 Hrs**

Introduces the techniques for safe handling of natural gas, liquefied petroleum gas, and fuel oil. Reviews fuel gas and fuel oil applications, systems installation, and testing.



### **PLUMBING LEVEL THREE - 160 / 240 Hrs**

- **Applied Math - 17.5 / 25 Hrs**

Introduces trainees to the math concepts they will use on the job, including weights and measures, area and volume, temperature, pressure, and force. Also reviews the six simple machines: inclined planes, levers, pulleys, wedges, screws, and wheels and axles.

- **Sizing and Protecting the Water Supply System - 30 / 40 Hrs**

Teaches techniques for sizing water supply systems, including calculating system requirements and demand, developed lengths, and pressure drops. Reviews the factors that can reduce efficiency of water supply piping. Introduces different backflow prevention devices and explains how they work, where they are used, and how they are installed in water supply systems.

- **Potable Water Supply Treatment - 15 / 20 Hrs**

Explains how to disinfect, filter, and soften water supply systems. Discusses how to troubleshoot water supply problems, flush out visible contaminants from plumbing systems, and disinfect a potable water plumbing system.

- **Types of Venting - 20 / 25 Hrs**

Reviews the different types of vents that can be installed in a DWV system and how they work. Also teaches design and installation techniques.

- **Sizing DWV and Storm Systems - 20 / 25 Hrs**

Explains how to calculate drainage fixture units for waste systems. Reviews how to size drain, waste, and vent (DWV) systems; storm drainage systems; and roof storage and drainage systems.

- **Sewage Pumps and Sump Pumps - 12.5 / 18 Hrs**

Discusses the installation, diagnosis, and repair of pumps, controls, and sumps in sewage and storm water removal systems.

- **Corrosive-Resistant Waste Piping - 7.5 / 10 Hrs**

Discusses corrosive waste and reviews related safety issues and hazard communications. Discusses how to determine when corrosive-resistant waste piping needs to be installed, as well as how to correctly select and properly connect different types of piping.

- **Compressed Air - 10 / 12 Hrs**

Explains the principles of compressed air systems and describes their components and accessories. Reviews installation and periodic servicing of air compressor systems.

- **Service Plumbing - 27.5 / 30 Hrs**

Covers the troubleshooting and repair of fixtures, valves, and faucets in accordance with code and safety guidelines. Explains how to diagnose and repair water supply and drainage piping, water heaters, and other appliances and fixtures. Describes the effects of corrosion, freezing, and hard water on plumbing systems.

### **PLUMBING LEVEL FOUR - 145 / 240 Hrs**

- **Business Principles for Plumbers - 15 / 20 Hrs**

Introduces trainees to concepts and practices that are essential for competitive, successful plumbing businesses. Covers basic business accounting project estimating, as well as techniques for cost control and task organization.

- **Fundamentals of Crew Leader - 20 / 30 Hrs**

Introduces trainees to the knowledge and skills required for team leadership. Covers practical information about today's construction industry; basic leadership skills; safety responsibilities of a supervisor; and a detailed survey of project control techniques.

- **Water Pressure Booster and Recirculation Systems - 12.5 / 18 Hrs**

Builds on trainees' previous experience with the pumps, storage tanks, controls, and pipes and fittings by teaching them to assemble those components into systems that boost water pressure and provide hot water.



- **Indirect and Special Waste - 17.5 / 20 Hrs**

Explains the code requirements and installation procedure for systems that protect against contamination from indirect and special wastes.

- **Hydronic and Solar Heating Systems - 17.5 / 20 Hrs**

Introduces the basic types of hydronic and solar heating systems and their components. Reviews hydronic and solar heating system layout and installation. Also discusses methods for inhibiting corrosion in solar heating systems.

- **Codes - 12.5 / 20 Hrs**

Discusses the different types of codes used by plumbers across the country and explains how these codes are written, adopted, modified, and implemented.

- **Private Water Supply Well Systems - 10 / 15 Hrs**

Explains the operation of pumps and well components. Review the qualities of good wells and how to assemble and disassemble pumps and components.

- **Private Waste Disposal Systems - 10 / 15 Hrs**

Describes the types of private sewage systems, discusses the maintenance and replacement of these systems, and explains how to determine the local code requirements for these systems. Covers percolation tests and sewage system planning and layout.

- **Swimming Pools and Hot Tubs - 7.5 / 12 Hrs**

Introduces trainees to plumbing systems in swimming pools, hot tubs, and spas. Allows trainees to learn to install and troubleshoot water supply systems and drains.

- **Plumbing for Mobile Homes and Mobile Home Parks - 7.5 / 12 Hrs**

Describes the location and layout of plumbing systems for mobile home and travel trailer parks. Reviews how to design and lay out a system, how to connect water and sewer lines to a mobile home, and how to estimate materials and costs for the park.

- **Introduction to Medical Gas & Vacuum Systems - 15.5 / 20 Hrs**

Introduces the various types of medical gas and vacuum systems used in the health care facilities. Covers the system requirements and professional qualifications required by code, describes common types of medical gas and vacuum systems, and introduces the safety requirements for installing, testing and servicing these systems

- **Exam Preparation - 15 / 20 Hrs**

Exam review & Preparation for getting licensed