FIRST SEMESTER

PLUMBING IA (105 Hrs)

INTRODUCTION TO THE TRADE (3hrs)

The nature and scope of the plumbing trade will be explained. This module will examine the structure of the trade from the beginning first year apprentice through the master plumber and will discusses the requirements and responsibilities of each. It also explores the history of the trade and the importance of its various developments.

OXY-ACETYLENE CUTTING AND WELDING FOR PLUMBERS (30 hrs)

The purpose of this class is to teach the plumber how to safely and effectively use an oxy-acetylene torch for cutting and brazing. The student will complete several plumbing related projects as well as study safety, theory, and maintenance of oxyacetylene equipment.

HUMAN RELATIONS (1.5 hrs)

The major purpose of this module is to identify those personal qualities that are positively related to a workers job success. It describes the importance of work ethic and understanding the employer's expectations. The importance of learning to communicate with all members of the work force will be examined.

MATERIAL CONTROL (1.5 hrs)

The class will discuss the principles of effective material control and its relationship to production schedules. It will also explore the negative effects of material and labor losses for the industry and to the individual worker.

BASIC JOB SAFETY (9 hrs)

This module will closely examine the OSHA job site safety requirements and will teach the student the importance of identifying and preventing potential hazards and possible injury. It will also prepare the student to effectively deal with job site injuries by providing Red Cross approved first aid training.

PIPES, FITTINGS, AND BASIC MATERIAL TERMINOLOGY (9hrs)
The first year plumber will learn to identify by name and purpose the plumbing the many types of materials and fittings used in trade. The characteristics of the various types of materials will be explored and compared.

BASIS MATHEMATICS (6 hrs)

This module presents a general review of the basic math procedures of adding, subtracting, multiplying and dividing whole numbers, fractions and mixed numbers. It will review the principles of equality, the square root, angle measure, and the conversion of length measure.

BASIC TRADE MATH (9 hrs)

This module will introduce the plumber to the mathematics used to calculate length of pipe, allowance for fittings, and the slope of pipe runs.

PLUMBING TERMINOLOGY (9 hrs)

Learning to understand and use the terminology of a trade is as important as learning to use the tools. This module will provide a glossary of major terms which have a special meaning to plumbers.

BASIC PLUMBING TOOLS (5 hrs)

In this module the basic plumbing tools and their uses will be explained and demonstrated. The importance of tool safety and maintenance will be emphasized.

PLUMBING FIXTURES AND APPLIANCES (7 hrs)

The basic types of fixtures are presented along with the principles of their operation. Materials used in their manufacture are also discussed.

FILTERING AND SOFTENING WATER (3 hrs)

The basic theory and operation of water filtering and water softening equipment is studied. The installation requirements are demonstrated.

PLUMBING SYSTEMS (6 hrs)

A discussion of the DWV, vent, potable water, natural gas, storm water and waste water treatment systems will give the first year plumber an over-view of the many different plumbing systems.

THE PLUMBING TRAP (3 hrs)

The skills that are necessary for the proper installation, maintenance, and servicing of traps and interceptors will be -acquired in this module. The plumber will also learn what functions the devices serve, how they operate, and the factors critical to their installation and operation.

INSTALLING AND SUPPORTING PIPE (3 hrs)

The identification and utilization of pipe hangers and supports is discussed. Procedures for locating and securing them are demonstrated.

SECOND SEMESTER
PLUMBING IB (75 bra)

TYPES OP VALVES AND FAUCETS (6 hrs)
Identification, application, operation, installation, repair and basic components of the various types of valves and faucets are presented.

VOLUMES, PRESSURE AND CAPACITIES (9 hrs) r
In this module the plumber will be instructed in the theory and calculation of head pressure and pressure loss. The formulas for determining the volumes and capacities of tanks, pipes and entire piping systems will be demonstrated and practiced.

JOINING CAST-IRON PIPE AND FITTINGS (4 hrs)
The plumber will learn how to identify, cut, measure, install, and join "hub and spigot" and "No-Hub" cast iron pipe and fittings.

JOINING GALVANIZED AND BLACK PIPE AND FITTINGS (3 hrs)
This module will instruct the plumber in measuring, cutting, reaming, threading, and assembling of galvanized and black iron pipe.

COPPER PIPES AND FITTINGS (5 hrs)
The correct procedure for flare and compression jointing, soldering a copper joint, as well as identifying and selecting the pipe and fittings for a typical pipe assembly will be demonstrated and practiced.

JOINING PLASTIC PIPE AND FITTINGS (3 hrs)
The plumber will be introduced to the different types and grades of plastic pipe and fittings and will learn the skills of plastic pipe joining, aligning, storing, and supporting.

PLUMBING PIPE OFFSETS(17 hrs)
The first year plumber will learn to master the mathematical calculations used for the installation of the various pipe offsets encountered in a piping system.

INTRODUCTION TO PLUMBING BLUEPRINT READING (6 hrs)
Learning to understand the various types of drawings used by the plumbers is essential to the communication of ideas. This module will introduce the basics of blueprint reading.

ISOMETRIC AND FLAT DRAWING (9 hrs)
The ability of a. plumber to communicate ideas by diagram is essential. In this module the plumber will be introduced to the plumbing isometric drawing. The student will learn the basics of isometric drawing and how to apply them to the isometric design of a plumbing system.

GRADE FOR DRAIN AND WASTE PIPING (3 hrs)

Calculating and measuring grade (slope) for drain and waste piping is covered. Includes consideration of hanging pipe overhead as well as installing pipe below grade.

THE BUILDERS LEVEL AND TRANSIT (10 hrs)

This module will introduce the plumber to the use of the builder's level and transit for laying out a building drainage system, for setting drains at the proper elevation and for grading a plumbing excavation. Special emphasis will be placed on the mathematical calculations required for use of these instruments.

FIRST SEMESTER
PLUMBING IIA (75 HRS)

OMAHA PLUMBING CODE, ARTICLES I, II and III (6 hrs)

A study of Article I through Article III in Section 49 - Omaha Plumbing Code will give the second year plumber an understanding of the structure of the plumbing trade as outlined in the city code. Interpretations, intent and applications of the code will be explained and discussed.

OMAHA PLUMBING CODE, ARTICLES IV, and V ' (3 hrs)

A study of Article I through Articles IV and V in Section 49 -Omaha Plumbing Code will teach the plumber about the code requirements for obtaining permits and inspections from the local authorities.

OMAHA PLUMBING CODE, ARTICLES VI, VII, and VIII (6 hrs)

A thorough study of the Omaha code requirements regarding "General Regulations", "Quality and Weight of Materials", and "Joints and Connections" will give the plumber a base from which to study the practical applications of the remaining Omaha Plumbing Code Articles.

ARC WELDING FOR PLUMBERS (30 hrs)

The purpose of this class is to teach the plumber how to safely and effectively use a stick arc welder. The student will complete several plumbing related projects as well as study safety, theory, and maintenance of arc welding equipment.

PUMPS AND VALVES (9 hrs)

An introduction to the different types of pumps and valves used in various plumbing systems. The plumber will learn how they work and what they are used for.

SIZING DRAINAGE SYSTEMS (12 hrs)

An introduction to the procedures for sizing drainage and waste piping as presented in Article IX of the Omaha Plumbing Code. Students will learn to apply these procedures when sizing the plumbing systems of both residential and commercial buildings.

SIZING VENT PIPING SYSTEMS (6 hrs)
An introduction to the methods for sizing the plumbing vent system is presented along with the Omaha Plumbing Code requirements of Article XII which regulate the installation. Practice will be given in sizing residential and commercial plumbing vent systems.

READING RESIDENTIAL BLUEPRINTS (6 hrs)

The plumber will learn to "read" a set of residential drawings and obtain the information necessary to design and perform the necessary plumbing work.

DESIGN OF A RESIDENTIAL WASTE AND VENT SYSTEM (9 hrs).

The basic types of residential combination waste and vent installations are described along with the Omaha Plumbing Code requirements of Article IX. Particular emphasis will be placed on the plumbing designs for single family homes, duplex residences, and the bathroom and kitchen stacks required in apartment buildings. The student will learn how to communicate the plumbing design by drawing isometric and schematic diagrams and will learn how to install it by actually piping the DWV system for different bathroom layouts in the plumbing lab.

'READING LIGHT COMMERCIAL(9 hrs) PLUMBING DRAWINGS

Techniques for interpreting drawings and specifications for light commercial plumbing projects are studied. Sample drawings and specifications will be used. Topics included in this module are:
Symbols and Abbreviations, Floor Plans, Elevation
Views, Sectional Views, Detail Views and Plot Plans

SECOND•SEMESTER
PLUMBING IIB (75 hrs)

DESIGN OF A COMMERCIAL WASTE AND VENT SYSTEM (18 hrs)

The basic types of commercial combination waste and vent installations are described along with the plumbing code requirements which control their installation. The student will practice communication of the plumbing design by drawing isometric and schematic plumbing diagrams.

SIZING AND INSTALLING THE RESIDENTIAL WATER SUPPLY SYSTEM (9 hrs)

Procedures for designing, sizing, supporting, fitting and installing the water supply piping based on fixture demand, installation standards and Article XIV of the Omaha Plumbing Code are studied in the classroom and practiced in the plumbing lab.

CLEANING AND DISINFECTING POTABLE WATER SYSTEMS (3 hrs)

The procedures for sanitizing water supply piping before putting it into service are presented.

TESTING DWV AND WATER SUPPLY PIPING SYSTEMS (6 HAS)
The equipment and procedures for conducting air, water, smoke, and dye tests are discussed and demonstrated. The student will perform water and air tests on the systems that were designed and installed in the plumbing lab during previous Modules. Safety and safety procedures are discussed.

JOINING, INSTALLING AND HANGING PIPE (12 hrs)

Various piping examples will be demonstrated and practiced by direct participation in the installation of cast iron, plastic, copper and steel piping in the plumbing lab. Special attention will be given to local code requirements pf Articles VII and VIII as well as necessary safety precautions.

INSTALLING ROOF, FLOOR AND AREA DRAINS (6 hrs)

The major topics include identification, location, and installation of roof, floor, and area drains. The various Articles of the Omaha Plumbing Code that apply will be reviewed.

USING THE BUILDERS LEVEL/TRANSIT (9 hrs)
6
Proficient use of a builders level/transit for the installation of a plumbing system is developed through classroom practice of problems and practical exercises in the plumbing lab.

INSTALLATION OF PLUMBING FIXTURES (6 hrs)

The guidelines for fixture installation found in Article VII of the Omaha Plumbing Code will be studied. The installation of various plumbing fixtures and appliances will be explained, demonstrated and practiced in the plumbing lab.

CALCULATING AND INSTALLING PLUMBING OFFSETS (6 hrs)

This module will present a hands-on approach to pipe offsets. The plumber will review the appropriate math skills required to calculate a pipe offset and will apply them to a variety of practical offset problems in the plumbing lab.

FIRST SEMESTER
PLUMBING III-A

INTRODUCTION TO THE UNIFORM PLUMBING CODE (UPC) (6 hrs)

In order for the local plumber to practice outside of Omaha it is necessary to have knowledge of the plumbing codes enforced in those communities. This module will introduce tbp student to the "Uniform Plumbing Code". The class will study it's history and limitations and comparisons will be *made with the local code.

LOCAL PLUMBING CODE TERMS AND DEFINITIONS (6 hrs)

In this module the plumber will review terminology as defined by the local plumbing code and will learn how to apply those definitions to code interpretation.

SOIL AND WASTE PIPING SYSTEMS (15 hrs)

A comprehensive study of soil and waste piping systems, which will include scientific principles, design, installation, distribution and treatment.

TRAPS AND CLEAN-OUTS (6 hrs)

The plumber will study the scientific principles, theory, design and applications of the various types of plumbing traps and clean-outs.

PLUMBING VENTS AND VENTING SYSTEMS (12 hrs)

A complete study of the theory, design and regulations regarding the plumbing venting system.

STORM DRAINAGE SYSTEMS (9 hrs)

The plumber will learn how to employ theory and code regulations in designing a storm drainage system complete with sump pumps, lift stations, roof drains, interceptors, inlets and catch basins.

PRIVATE SEWAGE DISPOSAL (9 hrs)
A study of the different types of private pewage treatment 'systems, Sewage treatment theory, regulations and the governing bodies.

MEDICAL GAS PIPING SYSTEMS (3 hrs)
A discussion of the various types of medical gas piping systems and the methods of installation.

SECOND SEMESTER
PLUMBING III-B

WATER SUPPLY AND DISTRIBUTION (9 hrs)

The plumber will examine the theory, and the regulations that regulate the water supply and distribution systems. TI principles and devices used for shock arresting, and back-flow prevention will also be discussed and demonstrated.

CIRCULATING SYSTEMS (6 hrs)

Circulating systems and the technical aspects of the pumps used in these systems will be studied and put into practice in the classroom and plumbing lab.

FIXTURE STANDARDS (3 hrs)

A complete study of Article XIII of the Omaha Plumbing Code which regulates the quality, the type, the handicap requirements, installation, and the required number of plumbing fixtures.

INDIRECT AND SPECIAL WASTES (3 hrs)

The regulations and purposes of indirectly wasting some plumbing fixtures will be discussed and demonstrated.

GAB AND VENT PIPING (6 hrs).
The MUD rules regulating the sizing and installation of a natural gas and exhaust flue piping systems will be studied.

UNDERSTANDING THE FUNDAMENTALS OF A COMMERCIAL BLUEPRINT (6 hrs)
The plumber will study the development, language, sheet classification, interpretation of sheet information and the interpretation of the job specification book.

PLUMBING ISOMETRIC DRAWINGS (12 hrs)

A study of the purpose, function and practical application of the isometric form of drawing for the plumber. The class will learn to use the isometric drawing method to draw a complete commercial plumbing system design.

READING AND WORKING WITH A COMMERCIAL BLUEPRINT (24 hrs)

The plumber is taught how to use the information given in a commercial blueprint for job management, plumbing design and lay-out of the plumbing systems. Extensive use of the related mathematics will be practiced.

DESIGN AND INSTALLATION OF IRRIGATION SYSTEMS (6 HRS)

The plumber will examine the local code requirements regarding the design and installation of lawn and garden irrigation systems. The selection, installation, and servicing of the various back-flow prevention devices will be explained and demonstrated.

FIRST SEMESTER
PLUMBING IV-A (75 hrs)

PLUMBING THEORY (12 hrs)

The scientific principles which explain why water supply and sewage systems function are presented and•related to the plumbing code. The mathematical formulas used for calculating pressure, flow, volume and friction loss will be applied to practical problems.

STORM WATER DRAINAGE SYSTEMS (6 hrs)

Methods for sizing horizontal and vertical storm drainage are examined along with national rainfall patterns, rainfall conversion methods, storm water retention and other storm. water removal methods.

WATER SOFTENING (6 hrs).

The theory, methods and equipment employed in the softening of water are explored.

OMAHA PLUMBING CODE (30 hrs)

All aspects of the Omaha Plumbing Code are thoroughly reviewed and applied to specific plumbing problems detailed by the instructor in the classroom . The plumber will gain a complete working understanding of Section 49 - of the ' Omaha Plumbing Code.

SIZING WATER PIPING (14 hrs)

This module will bring the plumber to an understanding of density and viscosity, friction and turbulence and their effect on pipe sizing.

OSHA SAFETY REGULATIONS (3 hrs)
The importance of job site safety and safety management will be stressed in an in-depth study and final review of the Occupational Safety and Health Administrations construction industry safety regulations.

FIRST AID TRAINING (4 hrs)
The plumber will receive a refresher course in Red Cross first aid training and will be given the opportunity to 'renew the first aid certificate obtained during the first year of apprenticeship.