

Course Catalog



Pipe UA
LOCAL
393
Trades
TRAINING CENTER

2024

HVACR

YEAR 1

APPT 151: RF-101 Basic Refrigeration Service Skills 108 hours1st Semester

Orientation to the apprenticeship program, JATC policies and procedures. UA history and heritage is also covered. Safety training is introduced, with instruction in general construction safety and hazardous materials awareness. Necessary trade skills, including pipe and tube installations and soldering and brazing.

Course objectives

- Describe the apprenticeship process
- Describe Union Heritage
- Work safely on the job
- Demonstrate proficiency in the use of common tools
- Demonstrate proficiency in pipe joining and installation skills-Perform soldering and brazing
- Demonstrate knowledge of proper handling of refrigerants
- Demonstrate basic office computer skills

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text
- Group and classroom participation

APPT 152: RF-102 Basic Electricity & Refrigeration 108 hours2nd Semester

A review of laws pertaining to basic electrical theory and their application to mechanical equipment service. Also covers refrigeration theory and application of the vapor compression cycle.

Course objectives

- Describe basic electrical fundamentals, including Ohm's Law and basic circuit types
- List and explain the function of various electrical devices and components
- Demonstrate the proper use of meters and simple components
- Apply the fundamentals of physics and the vapor compression cycle

Methods of evaluation

- Results of written quizzes and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text

APPT 153: RF-201 Mechanical System Fundamentals 108 hours1st Semester

Basic and advanced refrigeration concepts. Extensive study of the design, assembly, and operation of compression systems. Includes liquid and vapor control, metering devices, system components, and piping design.

Course objectives

- Describe heat flow and transfer
- Describe the vapor compression cycle
- Describe various refrigeration systems
- List the various system components and describe their purpose and operation
- List the various refrigerant control devices and describe their operation
- Log an operating system and evaluate operating parameter
- Demonstrate the removal and recovery of the refrigerant charge, system evacuation, and charging.

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects

APPT 154: RF-202 Electrical System Fundamentals 108 hours.....2nd Semester

Fundamentals of electrical controls related to HVAC and refrigeration equipment. Students assemble and wire actual electrical components and controls.

Course objectives

- Identify the essentials of an automatically controlled system
- Describe the fundamentals of measurement
- Describe the various types of control systems and their applications
- Describe types of control action and auxiliary control equipment
- Demonstrate the ability to interpret and construct electrical diagrams and circuits
- Demonstrate the use of electrical testing meters
- Describe purpose and application of motor controllers
- Describe the construction and application of thermostats

Methods of evaluation

- Lecture
- Lab Assignment
- Group discussion
- Hands on and verbal demonstrations



APPT 155: RF-301 Advanced Electric Systems 108 hours1st Semester

Advanced principles of electric controls used for mechanical equipment in the HVAC industry. Students study control diagrams and further develop skills and service procedures used to troubleshoot electrical problems in HVACR equipment.

Course objectives

- Describe function and installation of thermostats and actuators for two position controllers and for modulating control
- Describe and identify humidity, pressure, and miscellaneous controls
- Describe valve and damper control applications
- Explain primary source and secondary temperature control principles
- Control refrigeration machinery and water piping systems

- Describe combustion control applications
- Perform service procedures used to troubleshoot HVACR equipment components and electrical control circuits

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text

APPT 156: RF-302 HVACR Control Systems 108 hours.....2nd Semester

Introduction to HVAC fundamentals, energy sources, and control system principles. Focus on pneumatic, electrical, electronic, and building automation control systems and components.

Course objectives

- Describe HVAC system requirements and heat transfer principals
- Identify various types of HVAC system components and system energy sources
- Describe control system principals and components
- Describe pneumatic control system components and applications
- Define electrical control system principals and devices
- Identify and define solid state devices
- Perform electronic control system applications
- Perform building automation system installation, testing, and troubleshooting

Methods of evaluation

- Results of written quizzes and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text
- Group and classroom participation

APPT 157: RF-401 Advanced Mechanical Systems 108 hours.....1st Semester

Servicing industrial refrigeration and air conditioning systems. Covers alignment and repair of circulating pumps and compressors, as well as industrial valve applications and repair. Rigging procedures, refrigerant handling, and basic office computer skills are also covered in the computer lab.

Course objectives

- Identify and repair various types of circulating pumps
- Identify, assemble, and repair various types of industrial valves
- Perform service procedures for industrial HVACR systems
- Perform hands-on rigging operations
- Demonstrate basic office computer skills

Methods of evaluation

- Results of quizzes, written exercises, and final examination
- Maintenance of a student's workbook with questions drawn from text
- Group and classroom participation

APPT 158: RF-402 Advanced Refrigeration & Chillers 108 hours2nd Semester

Study of the operation and design of positive displacement water chillers and commercial chiller room equipment. Single-stage and multi-stage centrifugal water chillers are covered. Methods of evaluating chiller performance; students develop troubleshooting skills

Course objectives

- Describe the operation and design of positive displacement water chillers
- Evaluate total system efficiency
- Describe the operation and design of commercial chiller room equipment
- Describe operation of single-stage and multi-stage centrifugal water chillers
- Evaluate chiller performance

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text
- Group and classroom participation

APPT 159: RF 501 Start, Test & Balance; HVAC Systems 108 hours1st Semester

Use of balancing instruments and devices for HVACR systems. Covers theory and operation of mechanical systems, equipment, and testing instruments. This course stresses the necessity of comprehending the design and intent of the mechanical project, the proper use of testing apparatus, and the production of professional reports.

Course objectives

- Perform testing, balancing, and adjusting procedures on HVACR systems and components
- Explain properties of air and the use of psychometric charts
- Describe air distribution systems and accessories
- Start-up and perform initial test of air handling systems
- Balance air distribution systems

- Describe start-up and balancing procedures for hydronic systems

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text

APPT 129: Special Topics (UA STAR, Energy Audit) 54 hours2nd Semester (1st half)

Study of special topics. Students prep and take the UA STAR and Energy Audit Examination tests.

Course objectives

- Successfully pass UA STAR Test
- Successfully pass the Energy Audit Examination

Methods of evaluation

- Results of written exercises and final examination
- Group and classroom participation.

APPT 130: Review & Turnout 54 hours2nd Semester (2nd half)

A comprehensive overview of all refrigeration courses of instruction and preparation for completion examinations. Presentation of the latest current code and safety information. Planning and performing hands-on piping projects. Students perform hands-on troubleshooting projects for air conditioning systems.

Course objectives

- Relate the current code and safety regulations to the pipe trades industry
- Plan, organize, and implement a piping

- project
- Perform hands-on troubleshooting projects for air conditioning systems



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- Pass the final examinations to turn out as a journey person refrigeration/air conditioning mechanic

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Group and classroom participation



PLUMBING

YEAR 1

APPT 131: P-101 Basic Plumbing Skills 108 hours.....1st Semester

Orientation to the apprenticeship program, JATC policies and procedures. UA history and heritage will also be covered. Safety training is introduced, with instruction in general construction safety. This is followed up with necessary trade skills, including use and care of tools, pipe and tube installations, soldering, brazing, and other plumbing skills.

Course objectives

- Describe the apprenticeship process
- Describe Union Heritage
- Work safely on the job
- Demonstrate proficiency in the use of common tools
- Demonstrate proficiency in pipe joining and installation skills-Perform soldering and brazing

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text
- Group and classroom participation

APPT 132: P-102 Applied and Related Theory 108 hours.....2nd Semester

Review of basic math before introducing new concepts, including pipe measuring and calculation of simple offsets. Students learn fundamental scientific principles related to the installation and design of basic plumbing systems. Installation and design of fuel gas piping and drainage systems are also studied.

Course objectives

- Perform basic mathematical calculations
- Describe pipe measuring terms and their application
- Demonstrate the use and application of piping formulas
- Describe properties and characteristics of water and steam
- Describe hydraulic and mechanical principles
- Define differences between metals, alloys, and synthetics
- Define characteristics of fuel gases
- Define and identify fuel gas piping installations and materials

- Describe public health benefits and parameters of sewage disposal
- Explain basic design, layout, and installation of building drainage systems

Methods of evaluation

- Lecture
- Lab assignments
- Group discussion
- Demonstration



YEAR 2

APPT 133: P-201 Beginning Drawing and Design 108 hours.....1st Semester

Drawing fundamentals to instruction in isometric drawing. Students learn the proper design and sizing of simple waste, water, and gas systems. In-depth study of water supply systems is also included. Students also learn to read and interpret simple residential building plans, designing and coordinating plumbing systems within the structure.

Course objectives

- List the design criteria of drainage and domestic water supply systems, both outside and within the building
- Properly design and size waste/vent, water, and gas systems for a typical residential or small commercial building
- Identify and demonstrate the use of typical drawing tools
- Interpret the various building plans used in residential

- Produce working isometric drawings of waste and gas systems for a residential or small commercial application

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects of drawings and sizing assignments

APPT 134A: P-202A Rigging; Lay-out 54 hours 2nd Semester Part 1

Instruction in identification and tying various types of knots; study in hands-on safe practices of rigging and hoisting piping materials. Instruction in the use of a transit, builder's level, laser level, and other measuring instruments in the layout and installation of piping systems. Establish the invert elevations and coordination of piping systems by means of profile drawings.

Course objectives

- Demonstrate ability to identify and tie various types of knots and hitches
- Define safety protocol relative to rigging operations
- Demonstrate crane signals
- Identify proper rigging hardware and sling configurations
- Perform hands-on rigging operations using rigging equipment and machinery

- Describe the components and use of measuring tools, transits, and builder's levels
- Perform leveling procedures used for layout and installations of piping systems

Methods of evaluation

- Lecture
- Lab assignment
- Group discussion
- Hands on and verbal demonstrations



APPT 134B: Industrial Safety 54 hours..... 2nd Semester Part 2

Study of the requirements for emergency response to and handling of hazardous materials. Covers laws of chemical hazards, electrical hazards, personal protective equipment, confined spaces, monitoring equipment, and federal and Cal-OSHA standards for the construction industry.

Course objectives

- Identify regulators and legislation governing hazardous waste operations and response
- Describe the importance of occupational safety

- Demonstrate practical application of OSHA standards

Methods of evaluation

- Lecture and handouts
- Group discussion
- Demonstrations and hands on with verbal communication

YEAR 3

APPT 135A: P-301A Plumbing Fixtures 54 hours.....1st Semester Part 1

Instruction in plumbing fixtures and appliances. Names and design features of various plumbing fixtures are discussed. Study of proper installation, maintenance, and repair of fixtures and appliances

Course objectives

- Identify names and design features for various types of plumbing fixtures and appliances
- Describe the operating principles for installation and maintenance of most faucets, flush valves, common control devices, and water heaters

- List and explain the general criteria for installation, maintenance, and repair of plumbing fixtures and appliances

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text

APPT 135B: P301B Plumbing Codes 54 hours1st Semester Part 2

Students learn and demonstrate the procedures for coordinating the testing and inspection of plumbing systems and applicable codes that a plumbing systems test must meet. Knowledge of general regulations, including accessibility and ADA requirements, is also discussed.



Course objectives

- Define terms used in the Uniform Plumbing Code
- Demonstrate ability to locate and apply applicable code sections
- Demonstrate ability to properly size drain/waste/vent, potable water, and fuel gas systems

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text

APPT 136: P-302 Advanced Trade Math for Plumbers 108 hours.....2nd Semester

Extensive use of piping formulas to solve typical piping layout calculations. Students calculate compound offsets and accurately determine center to center and end to end piping measurements for plumbing systems.

Course objectives

- Demonstrate basic math skills using fractions, decimals, conversion tables, ratios, and compound measurements
- Illustrate the use of engineering and architectural measurements
- Calculate and lay-out a piping system using formulas, angles, symbols, and piping offsets

Methods of evaluation

- Lecture
- Assignments and homework
- Results of written exercises and final examination

YEAR 4

APPT 137A: P-401A Water Systems 54 hours.....1st Semester

Development and operation of domestic and industrial water supply and distribution systems for installation and operation. An overview of water sources, methods used to plan and configure supply, purification, and distribution systems, for operation and maintenance.

Course objectives

- Describe factors required to operate and maintain water distribution systems
- Describe the process of water testing
- Describe the water treatment process
- Describe various aspects of water distribution
- Describe the components and operation of high purity water systems (HPW)

- Describe factors required for an effective building water supply
- Describe backflow connection and cross-connection control

Methods of evaluation

- Results of quizzes, written exercises, and final examination
- Maintenance of a student's workbook with questions drawn from text
- Group and classroom participation



APPT 137B: P-401B Applied Welding 54 hours.....1st Semester

Instruction and practice in oxy-fuel cutting, oxy-fuel welding, and arc welding of steel plate and pipe. Safety and accuracy in measuring, lay-out, and torch handling is emphasized.

Course objectives

- Describe the basic theoretical principles associated with cutting and welding steel
- Safely perform cutting and welding processes
- Set up and use oxy-fuel and arc welding equipment

- Measure, lay-out, cut, and weld steel plate and pipe for fabrication

Methods of evaluation

- Results of final examinations
- Satisfactory completion of hands-on projects
- Group and classroom participation

APPT 138: P-402 Advanced Draw & Blueprint Read 108 hours.....2nd Semester

Interpretation of orthographic and isometric drawings and building plans that make up working drawings for the proper installation of piping systems. Covers standard graphic symbols used to represent piping, fittings, and valves on construction drawings, as well as various construction methods and materials, specifications, and submittals. Hands-on exercises in the creation and coordination of shop drawings.

Course objectives

- Describe basic print reading concepts
- Identify common types of drawings
- Describe scale drawings
- Identify standard graphic symbols used on construction drawings
- Describe common types of construction methods and materials
- Describe information contained on various plan pages, details, and specifications

- Create shop drawings
- Determine proper pipe sizing for commercial water, gas, waste, and vent installations

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text
- Group and classroom participation

YEAR 5

APPT 139A: Industrial Installations 54 hours.....1st Semester

Process piping and high purity water piping systems (HPW), including covering hazards associated with these installations. Presents water treatment and clean steam parameters for the pharmaceutical and biotech manufacturing industries. Covers pneumatic control systems, including the identification and installation of regulators and valves, pneumatic tubing, and use of air compressors and refrigerated air-dryers. Includes discussion of control systems. Hands-on experience with tube bending.



Course objectives

- Describe the characteristics of common process gasses used in high purity piping installations
- Define basic principles of high purity water (HPW) production
- Describe safe process piping HPW installation procedures
- Identify basic components of a pneumatic control system

- Demonstrate proper tube bending and installation techniques

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text

APPT 139B: Med Gas 54 hours.....1st Semester

Installation procedures of medical gas and vacuum systems. Apprentices learn about station outlets/inlets, manufactured assemblies, and pressure/vacuum indicators. Brazing requirements are described, and proper techniques are demonstrated. Practice of brazing techniques in order to prepare for the brazing qualification exam.

Course objectives

- State precautions to be used when working in a health care facility
- Describe procedures and requirements of medical gas and vacuum system installations
- Maintenance of student's workbook with questions drawn from text

- Summarize gas and vacuum system's testing procedures
- Pass NITC medical gas exam

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on project

APPT 129: Special Topics(UA Foreman) 54 hours.....2nd Semester

Study of special topics. Students further examine management techniques for planning and organizing projects

Course objectives

- Demonstrate management techniques through planning and organizing a complex piping project

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text
- Group and classroom participation.



APPT 130: Review & Turnout 54 hours.....2nd Semester

A comprehensive overview of the entire plumbing, courses of instruction and preparation for completion examinations. Presentation of the latest current code and safety information. Planning and performing hands-on piping projects. Students perform hands-on troubleshooting projects for air conditioning system

Course objectives

- Relate the current code and safety regulations to the pipe trades industry
- Plan, organize, and implement a piping project
- Perform hands-on troubleshooting projects for air conditioning systems
- Pass the final examinations to turn out as a journeyperson plumber, steamfitter, or refrigeration/air conditioning mechanic

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Group and classroom participation



RESIDENTIAL PLUMBING

YEAR 1

APPT 121: P-101 Intro to Residential Plumbing 54 hours1st Semester

An introduction to basic residential plumbing standards, employment information and procedures, history and heritage of plumbing, organization, and construction safety. Necessary trade skills, including cutting and threading, use and care of tools, and soldering and brazing are taught along with construction terminology and plumbing definitions.

Course objectives

- Demonstrate safe work practice
- Demonstrate proficiency in the use of common tool
- Demonstrate proficiency in pipe joining and installation skills

Method of evaluation

- Results of written quizzes and final examination
- Satisfactory completion of hands-on projects

APPT 122: P-102 Mathematics for Residential Plumbers 54 hours.....2nd Semester

A review of basic math concepts and operation, followed by instruction in pipe measurements, formulas, and off-set calculations. Use of common calculators will be included.

Course objectives

- Perform simple addition, subtraction, multiplication, and division
- Calculate pipe measurements and fitting allowances
- Perform off-set calculations

Methods of evaluation

- Results of written exercises, short quizzes, and end of session and end of module assessment
- Results of class participation

YEAR 2

APPT 123: P-201 Systems: Drainage, Water, Gas Installations 54 hours.....1st Semester

Overview of the installation and design criteria of residential hot and cold water, and fuel gas installations. Includes piping materials and hanger systems, material handling, and environmental concerns.

Course objectives

- Describe safe and efficient material handling techniques
- Identify the environmental aspects of proper plumbing practices
- Demonstrate proper cutting, joining, and support of steel pipe

Methods of evaluation

- Results of written exercises, short quizzes, and end of session and end of module assessment
- Satisfactory completion of hands-on project.



- Describe the properties of fuel gases and proper piping installations

APPT 124: P-202 Residential Plumbing Code 54 hours2nd Semester

A comprehensive overview of the Plumbing Code. Students examine each chapter of the code book and practice proper application through worksheets, system design, and sizing exercises

Course objectives

- Define terms used in the Uniform Plumbing Code Demonstrate ability to locate and apply applicable code sections
- Demonstrate ability to properly size residential drain/waste/vent, potable water, and fuel gas system

Methods of evaluation

- Results of written exercises, short quizzes, and end of session and end of module
- Assessment
- Class participation

YEAR 3

APPT 125: P-301 Waste Water Gas Systems Design and Sizing 54 hours.....1st Semester

Overview of the installation and design criteria of residential drainage, waste, and vent systems, with emphasis and study of the applied theory, design, and installation criteria. Includes application of local codes.

Course objectives

- Principles of drainage system venting and various venting method
- Components of building drainage systems
- UPC Code requirements in reference to drain waste and vent systems
- Water service and building water distribution system design requirements
- Drain waste and vent system design requirements

- Calculating fixture unit
- Calculate building water distribution pipe sizing
- Sizing of sanitary drainage and vent piping systems
- Natural gas building distribution piping
- Sizing of natural gas piping system

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of drawings



APPT 126: P-302 Residential Blueprint Reading and Drawing 54 hours.....2nd Semester

This course familiarizes students with the various blueprints, drawings, and sketches used in residential construction. Plan types, details, and symbols will be covered, as well as common construction terms and methods. Working from a set of building plans, students will create isometric drawings of plumbing systems.

Course objectives

- List the design criteria of drainage and domestic water supply systems, both outside and within the building
- Properly design and size waste/vent, water, and gas systems for a typical residential or small commercial building
- Identify and demonstrate the use of typical drawing tools-Interpret the various building plans used in residential
- Produce working isometric drawings of wastewater and gas systems for a residential or small commercial application

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects and drawings

YEAR 4

APPT 127: P-401 Residential Fixtures 54 hours.....1st Semester

Introduction to the various methods of inserting and sleeving in residential construction. Students practice the layout and installation of residential copper pipe and tube systems. Provides hands-on practice of plumbing fixture installation, service, and repair.

Course objectives

- Identify names and design features for various types of plumbing fixtures and appliances
- Describe the operating principles for installation and maintenance of most faucets, flush valves, common control devices, and water heaters

- List and explain the general criteria for installation, maintenance, and repair of plumbing fixtures and appliances

Methods of evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects



APPT 128: P-402 Back flow 54 hours2nd Semester
Introduction to backflow devices service and repair and cross-connection controls

Course objectives

- Describe safe work practices and procedures for working in excavations and confined spaces
- Demonstrate proficiency in the joining of polyethylene gas piping and fittings
- Demonstrate proficiency in performing common residential plumbing repairs
- Identify characteristics of good public and customer relations

Methods of evaluation

- Results of written exercises, short quizzes, and end of session and end of module assessment
- Class participation



STEAMFITTERS

YEAR 1

APPT 141: SF-101 Basic Steamfitting Skills 108 hours1st Semester 1

The Introduction to Steamfitting Apprenticeship class provides a foundational overview of steamfitting for newcomers to the trade. This course covers the basic principles of steam systems, including the properties of steam, pressure, and temperature, as well as fundamental pipefitting techniques. Students will be introduced to essential tools, safety practices, and basic system components such as valves and gauges. They also cover the orientation to the apprenticeship program, JATC policies and procedures. UA history and heritage will also be covered. Safety training is introduced, with instruction in general construction safety. This is followed up with necessary trade skills, including use and care of tools, pipe and tube installations, soldering, brazing, and other Steamfitting skills.

Course Objectives

- Describe the apprenticeship process
- Describe Union Heritage
- Work safely on the job
- Demonstrate proficiency in the use of common Steamfitting tools
- Demonstrate proficiency in pipe joining and installation skills-Perform soldering and brazing

Methods of Evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text
- Group and classroom participation

APPT 142: SF-102 Related Math, Drawing and Rigging 54 hours2nd Semester

Review of basic math before introducing new concepts, including pipe measuring and calculation of simple offsets. Students then learn drawing fundamentals before moving to instruction in isometric drawing. Instruction in identification and tying various types of knots, study of hands-on safe practices of rigging and hoisting piping materials. Students also learn basic computer skills.

Course Objectives

- Identify safe work practices when fastening fiber rope to heavy objects.
- Demonstrate ability to identify and tie types of knots and hitches used for rigging
- Demonstrate basic math operations
- Maintenance of a student's workbook with questions drawn from text

Methods of Evaluation

- Results of written exercises and final examination
- Satisfactory completion of hands-on projects
- Group and classroom participation



APPT 143A: Beginning Fit-Up, Cutting, and Welding 54 hours.....2nd Semester

Basic concepts and skills of cutting, tacking, and welding. Instruction on the breakdown and setup of oxy-fuel rigs; making different kinds of cuts and bevels on steel plate and pipe. Instruction on take-offs and fitting up butt welded fittings on a spool. Beginning welding concepts will also be discussed. Instruction on basic positions of welding on plate.

Course Objectives

- Understand Pipefitting Measurements and Layouts
- Master Cutting and Beveling Techniques
- Apply Fit-Up Procedures for Various Pipe Materials
- Troubleshoot and Resolve Fit-Up Issues

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback

YEAR 2

APPT 143: SF-201 Steamfitting, Cutting & Welding 108 hours.....1st Semester

The Steamfitting Cutting and Welding class for apprentices offers comprehensive training in the essential techniques of cutting and welding pipes for various applications. This course covers fundamental skills in pipe cutting, including the use of manual and mechanical cutters, as well as advanced techniques in welding, such as oxy-acetylene, MIG, and TIG welding. Students will learn to prepare pipe surfaces, select appropriate welding methods, and ensure strong, clean welds that meet industry standards. Emphasis is placed on safety protocols, precise measurements, and quality control to ensure durable and reliable pipe installations. Through practical exercises and hands-on projects, apprentices will develop the proficiency needed to perform cutting and welding tasks effectively in their pipefitting careers.

Course objectives.

- Understand Welding Fundamentals and Techniques
- Master Pipe Welding Procedures and Practices
- Ensure Quality and Integrity of Welds
- Apply Safety and Compliance Standards
- Troubleshoot and Correct Welding Defects

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback

APPT 144A: SF-202 Steamfitter Science; Elect & Air Cond 54 hours.....2nd Semester

The **Steamfitting Science** course offers an in-depth exploration of the principles and applications of steamfitting within various industrial contexts. This course delves into the scientific fundamentals of steam, including thermodynamics, fluid dynamics, and pressure systems, to equip students with a thorough understanding of how steam systems operate. Students will learn to analyze and interpret the behavior of steam in different conditions, apply scientific principles to optimize system performance, and troubleshoot common issues. The course combines theoretical knowledge with practical exercises, covering essential topics such as steam system design, component functionality, and system maintenance. By integrating scientific principles with hands-on practice, students will develop the skills necessary to ensure efficient, safe, and effective steam system operations in real-world settings.

Course objectives.

- Apply Scientific Principles to Pipefitting Tasks
- Understand Material Properties and Behavior
- Utilize Measurement and Testing Techniques
- Implement Safe Practices Based on Scientific Understanding
- Analyze and Solve Technical Problems

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback

APPT 134B: Industrial Safety (course for Plumbers & Steamfitters) 54 hours... 2nd Semester

Study of the requirements for emergency response to and handling of hazardous materials. Covers laws of chemical hazards, electrical hazards, personal protective equipment, confined spaces, monitoring equipment, and federal and Cal-OSHA standards for the construction industry.

Course objectives.

- Understand OSHA Regulations and Standards
- Identify and Assess Workplace Hazards
- Implement Effective Safety Practices and Procedures
- Conduct Safety Inspections and Risk Assessments
- Promote Safety Culture and Training

Course Evaluation

- Written Test or Quiz
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback

APPT 145: SF-301 Advanced Trade Math for Steamfitters 108 hours.....1st Semester

The Steamfitting Trade Math class focuses on equipping students with essential mathematical skills tailored for the steamfitting industry. This course covers fundamental arithmetic, unit conversions, and measurements specific to pipework and steam systems. Students will learn to perform accurate calculations for pipe sizing, flow rates, pressure drops, and system capacities. Emphasizing practical application, the course integrates real-world problems and hands-on exercises to enhance students' ability to apply mathematical concepts effectively in their steamfitting projects, ensuring precision and efficiency in their work.

Course objectives.

- Apply Mathematical Calculations for Pipe Measurements
- Utilize Trigonometry for Pipe Layouts and Angles
- Convert Units and Interpret Specifications
- Solve Problems Involving Pipe Volume and Flow Rates
- Apply Geometry for Pipe Fabrication and Assembly

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback

APPT 146: SF-302 Steam Technology 108 hours.....2nd Semester

The Steamfitting Steam Technology class explores the principles and applications of steam systems in industrial settings. This course covers the fundamental science behind steam generation, distribution, and utilization, including topics such as thermodynamics, steam pressure and temperature relationships, and boiler operations. Students will gain hands-on experience with steam system components, learn to optimize steam efficiency, and troubleshoot common issues. By integrating theoretical knowledge with practical skills, this course prepares students to effectively design, manage, and maintain steam systems for optimal performance and safety in various industrial environments.

Course objectives.

- Comprehensive Understanding of Steam Systems
- Design and Installation Skills
- Troubleshooting and Maintenance Expertise
- Adherence to Safety and Regulatory Standards

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback

APPT 147A: SF-401A Hydronic Systems 54 hours.....1st Semester

The Hydronics class for pipefitting apprentices provides a thorough introduction to the principles and practices of hydronic heating and cooling systems. This course covers the design, installation, and maintenance of systems that use water or glycol solutions to transfer heat efficiently within residential and commercial buildings. Students will learn about system components, including boilers, pumps, valves, and piping configurations, as well as best practices for balancing and troubleshooting hydronic systems. Through a blend of theoretical concepts and hands-on exercises, apprentices will develop the skills necessary to ensure optimal performance and reliability in hydronic system applications.

Course objectives.

- Understand Hydronic System Components
- Design and Calculate Hydronic Systems
- Install and Commission Hydronic Systems
- Diagnose and Troubleshoot System Issues
- Implement Safety and Compliance Practices

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback

APPT 147B: SF-401B Industrial Rigging 54 hours..... 1st Semester

The Rigging class for pipefitter apprentices focuses on the essential techniques and safety practices required for lifting and moving heavy pipe materials and equipment. This course covers fundamental rigging principles, including load calculations, rigging hardware, and safe lifting practices. Students will learn how to select and use slings, hoists, and cranes effectively while adhering to industry safety standards. Through hands-on training and practical exercises, apprentices will gain the skills necessary to perform rigging tasks safely and efficiently, ensuring the proper handling and placement of pipefitting materials in various job settings.

Course objectives.

- Mastery of Rigging Techniques
- Application of Load Calculations
- Adherence to Safety Standards
- Effective Communication and Coordination
- Problem-Solving and Troubleshooting Skills

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback



APPT 148: SF-402 Advanced Drawing & Blueprint Read 108 hours.....2nd Semester

The Advanced Blueprint Reading class for pipefitting apprentices delves into the intricate details of interpreting complex technical drawings and schematics. This course builds on basic blueprint reading skills, focusing on advanced concepts such as isometric drawings, detailed schematics, and multi-layered diagrams specific to pipefitting. Students will learn to decipher detailed symbols, annotations, and scale measurements, enabling them to accurately visualize and execute complex pipe systems and installations. Practical exercises will enhance their ability to translate blueprints into precise, actionable work, ensuring effective project planning and execution in real-world scenarios

Course objectives.

- Proficiency in Reading Technical Drawings
- Creation of Accurate Drawings
- Understanding of Drawing Standards and Symbols
- Application of Measurement and Scaling Techniques
- Integration of Drawing Information with Practical Work

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback

YEAR 5

APPT 139A: Indust Install (course for Plumbers & Steamfitters) 54 hours.....1st Semester

The Industrial Install class for pipefitting apprentices provides an in-depth exploration of designing, installing, and maintaining piping systems used in industrial processes. This course covers key aspects such as pipe material selection, flow dynamics, pressure ratings, and system integration, with a focus on ensuring system efficiency and safety. Students will learn to work with various types of process pipes, fittings, and valves, and will gain hands-on experience in layout planning and troubleshooting. Emphasis is placed on understanding process requirements, regulatory standards, and best practices to ensure reliable and effective piping solutions in diverse industrial settings

Course objectives.

- Proficiency in Pipe Layout and Design
- Skills in Pipe Fabrication and Installation
- Application of System Specifications and Codes(TGO)
- Competence in System Testing and Troubleshooting
- Integration of Safety and Best Practices

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback
- Writen report and presentation



APPT 139B: Med Gas Install (course for Plumbers & Steamfitters) 54 hours.....1st Semester

The Medical Gas Piping class for apprentices provides specialized training in the installation and maintenance of medical gas systems used in healthcare facilities. This course covers the design, assembly, and safety requirements specific to medical gases such as oxygen, nitrous oxide, and medical air. Students will learn about the regulatory standards, certification processes, and best practices for ensuring the reliability and safety of medical gas systems. Hands-on training includes working with piping materials, components, and testing procedures to ensure compliance with industry regulations and standards, preparing apprentices to handle critical systems in healthcare environments effectively.

Course objectives.

- Understand Medical Gas Systems
- Design and Layout Medical Gas Piping
- Install and Test Medical Gas Piping
- Implement Safety Protocols and Regulations
- Troubleshoot and Maintain Medical Gas Systems

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback

APPT 129: Special Topics (Rigging) 54 hours.....2nd Semester

The EPRI Rigging class provides specialized training based on the Electric Power Research Institute (EPRI) standards, focusing on advanced rigging techniques for the power generation and industrial sectors. This course covers critical aspects such as load calculations, rigging hardware selection, and safety protocols specific to high-stakes environments. Students will gain practical skills in lifting and maneuvering heavy equipment, with a strong emphasis on adhering to EPRI guidelines to ensure safety and efficiency. Hands-on exercises and case studies will prepare participants to handle complex rigging scenarios with precision and compliance, enhancing their expertise in the field.

Course objectives.

- Mastery of Rigging Techniques
- Application of Load Calculations
- Adherence to Safety Standards
- Effective Communication and Coordination
- Problem-Solving and Troubleshooting Skills

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Continuous Improvement and Feedback



APPT 130: Review & Turnout 54 hours2nd Semester

This class reviews the entire apprenticeship program and has a series of evaluations related to the learning outcomes of the 5 year program. This includes, but is not limited to Soldering, Threading, Knot Tying, Cutting and Welding, Rigging, Drawing and Blueprint reading, General knowledge of the trade.

Course objectives.

- Comprehensive Skill Development
- In-Depth Knowledge of Codes and Standards
- Advanced Problem-Solving and Troubleshooting
- Expertise in System Design and Layout
- Leadership and Project Management Skills

Course Evaluation

- Written Test or Quiz
- Project or Task-Based Evaluation
- Behavioral and Soft Skills Assessment
- Rigging Practical Exam