
Appendix A

(Sponsor(s) with multiple occupations must complete an Appendix A for each occupation)

WORK PROCESS SCHEDULE

AND

RELATED INSTRUCTION OUTLINE

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Appendix A

WORK PROCESS SCHEDULE

Laborer

O*NET-SOC CODE: [Click to enter O*NET Code](#) **RAPIDS CODE:** [Click to enter RAPIDS Code](#)

This schedule is attached to and a part of these Standards for the above identified occupation.

1. APPRENTICESHIP APPROACH

Time-based Competency-based Hybrid

2. TERM OF APPRENTICESHIP

The term of the apprenticeship is 2 years with an OJL attainment of 2146 hours, supplemented by the minimum required 500 hours of related instruction. (Note: The competency-based training approach does not require hours.)

3. RATIO OF APPRENTICES TO JOURNEYWORKERS

The apprentice to journeyworker ratio is: 2 Apprentice(s) to 1 Journeyworker(s).

4. APPRENTICE WAGE SCHEDULE

Apprentices shall be paid a progressively increasing schedule of wages based on either a percentage or a dollar amount of the current hourly journeyworker wage rate, which is: \$15.

1 increase every 6 months and 500 hours- +\$10/hour

5. PROBATIONARY PERIOD

Every applicant selected for apprenticeship will serve a probationary period of #16 weeks.

6. SELECTION PROCEDURES

Please enter selection procedures for this occupation:



-
1. Outlining the Position to potential apprentice at an information session.
 2. The Job Description will express our expectations to applicant in same info session.
 3. Screening Resumes and Applications to identify candidates.
 4. Distributing Pre-Interview Assessments to potential applicants to determine level of skill/basic knowledge level
 5. Preparing For Interviews for follow up after info session and assessment.
 6. Conducting An Interview, set interview with panel members.
 7. Selecting The Candidate based on merit, character, and willingness to participate combined.
 8. Performing Background Checks (while open to ex-offenders, we are still running checks to ensure the safety of participants and staff will be protected by knowing offenses up front)
 9. Make an Offer by sending letters of acceptance into the program via snail or email.
 10. Onboard New hire process welcome lunch and meet and greet along with one week orientation to kick off program.

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WORK PROCESS SCHEDULE

Occupation Title

O*NET-SOC CODE: *Click to enter O*NET Code* **RAPIDS CODE:** *Click to enter RAPIDS Code*

Instructions for entering the Work Process Schedule:

Time-Based Occupation: Please provide the Work Process Schedule below to include the Job Tasks (left column) required to complete the apprenticeship program with the approximate amount of time (right column) the apprentice will spend in each task.

Hybrid Occupation: Please include the minimum/maximum number of hours (right column) with the breakdown of the Job Tasks and the successful demonstration of competencies described in the WPS (left column), required to complete the apprenticeship program and identify an appropriate means of testing and evaluation for such competencies.

Competency-based Occupation: Please describe competencies required for the apprenticeship (left column and identify an appropriate means of testing and/or evaluating for such competencies (right column).

Approximate Hours: 500/35 competencies=14.3 hours per title

Work Process Schedule:

Thermal & moisture protection	Properties of building materials (UV durability, weatherability)	Knowledge of green manufacturing materials, processes	Sustainability principles	Knowledge of audit checklists	Principles of integrated design	Knowledge of the sequencing and scheduling of specialty trades
Mold/indoor air quality (IAQ and radon)	Moisture migration and control	Building Materials	Overview of history of building science and methods	Recycling on site	Greenhouse gases & buildings/ambient noise. Radiant heat, hydronic	Understand the layout process
Knowledge of foundation systems	Ability to read the blueprints and understand the site plan and symbols	Understanding of site orientation of the building	Ability to draw plans	CAD and basic mechanical drafting/illustration	Understanding of drainage, dry wells, septic	Research effectively on the internet
Math: geometry, arithmetic, trigonometry, algebra	OSHA, WSHA, and industry safety procedures and regulations	Ability to perform job hazard analysis	Building codes	Construction standards	Environmental regulations	Purchasing and Development of vacant land strategic planning
Public Speaking: On/Off Camera Speaking; interpersonal	Entrepreneurship and your trade	Technology centered Trade business	Business Etiquette	Marketing your trade	Excellence in Leadership and critical thinking	Excellence in Customer Service and business organizing

TOTAL MINIMUM HOURS 500



RELATED INSTRUCTION OUTLINE

Occupation Title

O*NET-SOC CODE: [Click to enter O*NET Code](#) **RAPIDS CODE:** [Click to enter RAPIDS Code](#)

Instructions for entering the Related Instruction Outline for all occupation approaches:

Please provide the Related Instruction Outline to include a list of the anticipated courses, the learning objectives, and the estimated number of hours that each course will last.

Related Instruction Descriptions

Approximate Hours: 2,146

I. General Construction (433 hours; Can also be Pre-Apprenticeship)

Basic Safety (Construction Site Safety Orientation) (12.5 Hours) Presents basic jobsite safety information to prepare workers for the construction environment. Describes the common causes of workplace incidents and accidents and how to avoid them. Introduces common personal protective equipment, including equipment required for work at height, and its proper use. Information related to safety in several specific environments, including welding areas and confined spaces, is also provided.

Basic Communication Skills (7.5 Hours) Provides techniques for effective communication on the job. Includes examples that emphasize the importance of both written and verbal communication skills. Describes the importance of reading skills in the construction industry and discusses effective telephone and email communication skills.

Basic Employability Skills (7.5 Hours) Describes the opportunities offered by the construction trades. Discusses critical thinking and essential problem-solving skills. Also identifies and discusses positive social skills and presents information on computer systems and their industry applications.

Construction Math (10 Hours) Reviews basic math skills related to the construction trades and demonstrates how they apply to the trades. Covers multiple systems of measurement, decimals, fractions, and basic geometry.

Introduction to Hand Tools (10 Hours) Introduces common hand tools used in a variety of construction crafts. Identifies tools and how to safely use them. Also presents proper hand tool maintenance.

Introduction to Power Tools (10 Hours) Identifies and describes the operation of many power tools common in the construction environment. Provides instruction on proper use, as well as safe-handling guidelines and basic maintenance.



Introduction to Construction Drawings (10 Hours) Introduces the basic terms, components, and symbols of construction drawings, as well as the most common drawing types. Also covers the interpretation and use of drawing dimensions.

Introduction to Basic Rigging (7.5 Hours) Provides basic information related to rigging and rigging hardware, such as slings, rigging hitches, and hoists. Emphasizes safe working habits in the vicinity of rigging operations.

Introduction to Material Handling (5 Hours) Describes the hazards associated with handling materials and provides techniques to avoid both injury and property damage. Also introduces common material handling equipment.

Introduction to Masonry (12.5 Hours) Covers basic masonry materials, tools, techniques, and safety precautions. Explains how to mix mortar by hand and lay masonry units. Also describes the skills, attitudes, and abilities of successful masons.

Masonry Units and Installation Techniques (60 Hours) Covers characteristics of block and brick; how to set up, lay out, and bond block and brick; how to cut block and brick; how to lay and tool block and brick; and how to clean block and brick once they have been laid. Describes masonry reinforcements and accessories used to lay block and brick professionally and safely.

Floor Systems (27.5 Hours) Covers framing basics and the procedures for laying out and constructing a wood floor using common lumber, as well as engineered building materials.

Ceiling Joist and Roof Framing (40 Hours) Describes types of roofs and provides instructions for laying out rafters for gable roofs, hip roofs, and valley intersections. Covers stickbuilt and truss-built roofs. Includes the basics of roof sheathing installation.

Roofing Applications (25 Hours) Describes how to properly prepare the roof deck and install roofing for residential and commercial buildings.

Wall Systems (20 Hours) Describes procedures for laying out and framing walls, including roughing in door and window openings, constructing corners, partition Ts, and bracing walls. Includes the procedure to estimate the materials required to frame walls.

Exterior Finishing (35 Hours) Covers the various types of exterior finish materials and their installation procedures, including wood, metal, vinyl, and fiber-cement siding.

Basic Stair Layout (12.5 Hours) Introduces types of stairs and common building code requirements related to stairs. Focuses on techniques for measuring and calculating rise, run, and stairwell openings, laying out stringers, and fabricating basic stairways.

Electrical Safety (10 Hours) Covers safety rules and regulations for electricians, including precautions for electrical hazards found on the job. Also covers the OSHA mandated



lockout/tagout procedure.

Residential Electrical Services (15 Hours) Covers the electrical devices and wiring techniques common to residential construction and maintenance. Allows trainees to practice making service calculations. Stresses the applicable NEC® requirements.

Introduction to HVAC (7.5 Hours) Covers the basic principles of heating, ventilating, and air conditioning, career opportunities in HVAC, and how apprenticeship programs are constructed. Basic safety principles, as well as trade licensure and EPA guidelines, are also introduced.

Introduction to Drain, Waste, and Vent (DWV) Systems (10 Hours) Explains how DWV systems remove waste safely and effectively. Discusses how system components, such as pipe, drains, traps, and vents work. Reviews drain and vent sizing, grade, and waste treatment. Discusses how building sewers and sewer drains connect the DWV system to the public sewer system.

Plastic Pipe and Fittings (12.5 Hours) Introduces 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 the manufacturer's instructions and applicable codes. Discusses pressure testing of plastic pipe once installed.

Copper Pipe and Fittings (12.5 Hours) Discusses sizing, labeling, and applications of copper pipe and fittings, and reviews the types of valves that can be used on copper pipe systems. Explains proper methods for cutting, joining, and installing copper pipe. Addresses insulation, pressure testing, seismic codes, and handling and storage requirements.

Cabinetmaking (35 Hours) This module expands on the knowledge and skills gained through the Carpentry Curriculum and provides the basic information needed to construct and apply finishes to custom cabinetry. It identifies and discusses various types of wood products, wood-joining techniques, power tools, cabinet doors, shelves, and hardware. Specific guidance is also provided for the installation of laminated countertops.

Cabinet Installation (10 Hours) Provides detailed instructions for the selection and installation of base and wall cabinets and countertops.

Modular Building construction (8 hours): This will discuss the modular building process compared to traditional site-built construction and is designed to help the participant understand terminology and concepts of modular building including client needs, design, fabrication, transportation, and installation.

II. Masonry (122.5 hours)

Introduction to Masonry (12.5 Hours) Covers basic masonry materials, tools, techniques, and safety precautions. Explains how to mix mortar by hand and lay masonry units. Also describes the skills, attitudes, and abilities of successful masons.



Masonry Safety (15 Hours) Describes how to identify the common causes of accidents and the hazards associated with masonry tools, equipment, mortar, and concrete. Focuses on using personal protective equipment, working safely from elevated surfaces, properly using masonry tools and equipment, and handling masonry materials safely.

Masonry Tools & Equipment (15 Hours) Describes a variety of hand tools, measuring tools, mortar equipment, power tools and equipment, and lifting equipment that masons use on the job, and explains how to use these tools correctly and safely. Provides instructions for assembling and disassembling scaffolds.

Measurements, Drawings, and Specifications (10 Hours) Reviews the calculation of distances and areas common in masonry work; describes the information found on residential construction drawings; and explains the role of specifications, standards, and codes.

Mortar (10 Hours) Explains the types and properties of mortar and the materials used in the mixture, including admixtures; provides instructions for mixing mortar by machine; and describes how to properly apply and store mortar.

Masonry Units and Installation Techniques (60 Hours) Covers characteristics of block and brick; how to set up, lay out, and bond block and brick; how to cut block and brick; how to lay and tool block and brick; and how to clean block and brick once they have been laid. Describes masonry reinforcements and accessories used to lay block and brick professionally and safely

III. Carpentry (300 hours)

Orientation to the Trade (2.5 Hours) Reviews the history of the trade, describes the apprentice program, identifies career opportunities for carpenters and construction workers, and lists the skills, responsibilities, and characteristics a worker should possess. Emphasizes the importance of safety in the construction industry.

Building Materials, Fasteners, and Adhesives (20 Hours) Introduces the building materials used in construction work, including lumber, sheet materials, engineered wood products, structural concrete, and structural steel. Also describes the fasteners and adhesives used in construction work. Discusses the methods of squaring a building.

Hand and Power Tools (10 Hours) Provides descriptions of hand tools and power tools used by carpenters. Emphasizes safe and proper operation, as well as care and maintenance.

Introduction to Construction Drawings, Specifications, and Layout (22.5 Hours) Covers the techniques for reading and using construction drawings and specifications, with an emphasis on drawings and information relevant to the carpentry trade. Introduces quantity takeoffs.

Floor Systems (25 Hours) Covers framing basics and the procedures for laying out and constructing a wood floor using common lumber, as well as engineered building materials.



Wall Systems (10 Hours) Describes procedures for laying out and framing walls, including roughing-in door and window openings, constructing corners, partition Ts, and bracing walls. Includes the procedure to estimate the materials required to frame walls.

Ceiling Joist and Roof Framing (47.5 Hours) Describes types of roofs and provides instructions for laying out rafters for gable roofs, hip roofs, and valley intersections. Covers stick-built and truss-built roofs. Includes the basics of roof sheathing installation.

Introduction to Building Envelope Systems (12.5 Hours) Introduces the concept of the building envelope and explains its components. Describes types of windows, skylights, and exterior doors, and provides instructions for installation.

Vertical Formwork (22.5 Hours) Covers the applications and construction methods for types of forming and form hardware systems for walls, columns, and stairs, as well as slip and climbing forms. Provides an overview of the assembly, erection, and stripping of gang forms.

Horizontal Formwork (15 Hours) Describes elevated decks and formwork systems and methods used in their construction. Covers joist, pan, beam and slab, flat slab, composite slab, and specialty form systems and provides instructions for the use of flying decks, as well as shoring and reshoring systems.

Tilt-Up Wall Systems (17.5 Hours) Describes how tilt-up concrete construction is used and how tilt-up panels are formed, erected, and braced. Covers the installation of rebar and types of embedments used to lift and brace the panels. Also includes methods used to create architectural and decorative treatments.

Cold-Formed Steel Framing (15 Hours) Describes the types and grades of steel framing materials, and includes instructions for selecting and installing metal framing for interior and exterior walls, loadbearing and nonbearing walls, partitions, and other applications.

Roofing Applications Elective for Commercial Path (25 Hours) Describes how to properly prepare the roof deck and install roofing for residential and commercial buildings.

Doors and Door Hardware (20 Hours) Describes the installation of metal doors and related hardware in steel-framed, wood-framed, and masonry walls, along with their related hardware, such as locksets and door closers. Also discusses the installation of wood doors, folding doors, and pocket doors.

Window, Door, Floor, and Ceiling Trim (25 Hours) Describes the different types of trim used in finish work and focuses on the proper methods for selecting, cutting, and fastening trim to achieve a professional finished appearance.

Cabinet Installation (10 Hours) Provides detailed instructions for the selection and installation of base and wall cabinets and countertops.



IV. Drywall (82 hours)

Introduction to Construction Equipment (7.5 Hours) Introduces construction equipment, including the aerial lift, skid steer loader, electric power generator, compressor, compactor, and forklift. An overview of general safety, operation, and maintenance procedures is provided.

Orientation to the Trade (5 Hours) Reviews the history of the trade, shows examples of the work involved, describes the apprentice program, identifies career opportunities for construction workers, and lists the responsibilities and characteristics a worker should possess.

Construction Materials and Methods (12 Hours) Provides an overview of the materials and techniques used in building and finishing residential and commercial buildings, including wood- and steel-framed structures, masonry construction, and concrete-formed structures.

Thermal and Moisture Protection (7.5 Hours) Covers the selection and installation of insulating materials in walls, floors, and attics. Also covers the uses and installation practices for vapor barriers and waterproofing materials.

Drywall Installation (25 Hours) Discusses types of gypsum drywall, their uses, and the fastening devices and methods used to install them. Describes installing drywall on walls and ceilings using nails, drywall screws, and adhesives. Also covers fire- and sound-rated walls.

Drywall Finishing (25 Hours) Covers the materials, tools, and methods used to finish and patch gypsum drywall, including automatic and manual taping tools.

IV (A). PAINTING (92.5 hours)

Safety (10 Hours) Provides an overview of construction site hazards and safety precautions for those in the painting trade. Covers methods of rigging and care of ladders, scaffolds, swing devices, and other equipment.

Ladders, Scaffolds, Lifts, and Fall Protection (10 Hours) Covers methods of erecting, using and maintaining ladders, scaffolds, and lifts. Discusses fall protection equipment and safety practices used when working on ladders, scaffolds, and lifts.

Identifying Surface/Substrate Materials and Conditions (5 Hours) Explains how to identify types of surfaces used in construction including wood, metal, masonry/concrete, plaster/drywall and synthetic substrates. Also discusses how to identify new, aged, or previously coated surface conditions of substrates and coatings.

Protecting Adjacent Surfaces (5 Hours) Describes the tools, materials, and methods used for protecting adjacent surfaces

Basic Surface Preparation (15 Hours) Covers the tools, materials, and methods used for cleaning,



repairing, and penetrating surfaces/ substrates in preparation for coating. Describes basic methods used for surface preparation of wood, metal, plaster/drywall, cementitious, and synthetic surfaces/substrates.

Sealants and Repair/Fillers (5 Hours) Describes the characteristics of common sealants and fillers. Covers guidelines for selecting sealants/ fillers and the tools and methods used to apply them to substrates.

Introduction to Paints and Coatings (10 Hours) Describes the basic ingredients and film forming processes common to all paints and coatings. Covers paint systems and functional categories of paints and coatings. Focuses on water-based alkyd paints and coatings.

Brushing and Rolling Paints and Coatings (15 Hours) Covers the types and selection of brushes, rollers, pads, mitts, and related accessories used for applying paints and coatings. Includes techniques used for brushing and rolling paints and coatings on interior and exterior surfaces. Also recommends maintenance and storage methods.

Painting Failures and Remedies (7.5 Hours) Describes failures of paints/coatings on exterior and interior substrates, causes of these failures, and their remedies. Focuses on the nature of the substrates, application procedures, and surface preparation.

Job Planning and Completion (10 Hours) Explains the process for estimating a job to submit a bid. Also covers the processes for planning and accomplishing a job from start to finish with emphasis placed on the importance and use of drawings, specifications, schedules, and other instructions.

V. ELECTRICAL (187.5 hours)

Orientation to the Electrical Trade (2.5 Hours) Provides an overview of the electrical trade and discusses the career paths available to electricians.

Electrical Safety (10 Hours) Covers safety rules and regulations for electricians, including precautions for electrical hazards found on the job. Also covers the OSHA-mandated lockout/tagout procedure.

Introduction to Electrical Circuits (7.5 Hours) Introduces electrical concepts used in Ohm's law applied to DC series circuits. Covers atomic theory, electromotive force, resistance, and electric power equations.

Electrical Theory (7.5 Hours) Introduces series, parallel, and series parallel circuits. Covers resistive circuits, Kirchhoff's voltage and current laws, and circuit analysis.

Introduction to the National Electrical Code® (7.5 Hours) Provides a road map for using the NEC®. Introduces the layout and the types of information found within the code book. Allows trainees to practice finding information using an easy-to-follow procedure.



Device Boxes (10 Hours) Covers the hardware and systems used by an electrician to mount and support boxes, receptacles, and other electrical components. Also covers NEC® fill and pull requirements for device, pull, and junction boxes under 100 cubic inches.

Hand Bending (10 Hours) Introduces conduit bending and installation. Covers the techniques for using hand-operated and step conduit benders, as well as cutting, reaming, and threading conduit.

Raceways and Fittings (20 Hours) Introduces the types and applications of raceways, wireways, and ducts. Stresses the applicable NEC® requirements.

Conductors and Cables (10 Hours) Focuses on the types and applications of conductors and covers proper wiring techniques. Stresses the applicable NEC® requirements.

Basic Electrical Construction Drawings (7.5 Hours) Describes electrical prints, drawings, and symbols, and the types of information that can be found on schematics, one-lines, and wiring diagrams.

Residential Electrical Services (15 Hours) Covers the electrical devices and wiring techniques common to residential construction and maintenance. Allows trainees to practice making service calculations. Stresses the applicable NEC® requirements.

Electrical Test Equipment (5 Hours) Covers proper selection, inspection, and use of common electrical test equipment, including voltage testers, clamp-on ammeters, ohmmeters, multimeters, phase/motor rotation testers, and data recording equipment. Also covers safety precautions and meter category ratings.

Electric Lighting (15 Hours) Introduces principles of human vision and the characteristics of light. Focuses on the handling and installation of various types of lamps and lighting fixtures.

Circuit Breakers and Fuses (12.5 Hours) Describes fuses and circuit breakers along with their practical applications. Also covers sizing.

Control Systems and Fundamental Concepts (12.5 Hours) Gives basic descriptions of various types of contactors and relays along with their practical applications.

Commercial Electrical Services (10 Hours) Covers the components, installation considerations, and NEC® requirements for commercial services.

Standby and Emergency Systems (10 Hours) Explains the NEC® requirements for electric generators and storage batteries.

Fire Alarm Systems (15 Hours) Covers fire alarm control units, Digital Alarm Communicator Systems (DACS), wiring for alarm initiating and notification devices, and alarm system



VI. HVAC (135 hours)

Introduction to HVAC (7.5 Hours) Covers the basic principles of heating, ventilating, and air conditioning, career opportunities in HVAC, and how apprenticeship programs are constructed. Basic safety principles, as well as trade licensure and EPA guidelines, are also introduced.

HVAC Controls (15 Hours) Provides a basic overview of HVAC systems and their controls. Also covers electrical troubleshooting and NEC® requirements.

Trade Mathematics (10 Hours) Explains how to solve HVAC/R trade related problems involving the measurement of lines, area, volume, weights, angles, pressure, vacuum, and temperature. Also includes a review of scientific notation, powers, roots, and basic algebra and geometry.

Basic Electricity (12.5 Hours) Introduces the concept of power generation and distribution, common electrical components, AC and DC circuits, and electrical safety as it relates to the HVAC field. Introduces reading and interpreting wiring diagrams.

Introduction to Heating (15 Hours) Covers the fundamentals of heating systems and the combustion process. Provides the different types and designs of gas furnaces and their components, as well as basic procedures for their installation and service.

Introduction to Cooling (30 Hours) Explains the fundamental operating concepts of the refrigeration cycle and identifies both primary and secondary components found in typical HVAC/R systems. Also introduces common refrigerants. Describes the principles of heat transfer and the essential pressure-temperature relationships of refrigerants. Introduces basic control concepts for simple systems.

Introduction to Air Distribution Systems (15 Hours) Describes the factors related to air movement and its measurement in common air distribution systems. Presents the required mechanical equipment and materials used to create air distribution systems. Introduces basic system design principles for both hot and cold climates.

Basic Copper and Plastic Piping Practices (10 Hours) Explains how to identify types of copper tubing and fittings used in the HVAC/R industry and how they are mechanically joined. Also presents the identification and application of various types of plastic piping, along with their common assembly and installation practices.

Soldering and Brazing (10 Hours) Introduces the equipment, techniques, and materials used to safely join copper tubing through both soldering and brazing. Covers the required personal protective equipment, preparation, and work processes in detail. Also provides the procedures for brazing copper to dissimilar materials.

Basic Carbon Steel Piping Practices (10 Hours) Explains how to identify various carbon steel piping materials and fittings. Covers the joining and installation of threaded and grooved carbon



steel piping systems, including detailed descriptions of threading and grooving techniques.

VII. PLUMBING (157.5 hours)

Introduction to the Plumbing Profession (5 Hours) Introduces trainees to career options in the plumbing profession. Provides a history of plumbing and also discusses the current technology, industries, and associations of the plumbing profession. Reviews human relations and safety skills.

Plumbing Safety (22.5 Hours) Discusses the causes of accidents and their consequences including delays, increased expenses, injury, and loss of life. Reviews the types and proper use of personal protective equipment (PPE). Explains the use of critical safety information including HazCom, safety signs, signals, 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 Hours) Describes the care and use of hand and power tools trainees will use on the job. Explains how to select the appropriate tools for different tasks, and reviews tool maintenance and safety issues.

Introduction to Plumbing Math (12.5 Hours) Reviews basic math concepts, such as whole numbers, fractions, decimals, and squares, and demonstrates how they apply to on-the-job situations. Explains how to measure pipe using fitting tables and framing squares and how to calculate 45-degree offsets.

Introduction to Plumbing Drawings (17.5 Hours) Introduces different types of plumbing drawings and discusses how to interpret and apply them when laying out and installing plumbing systems. Explains the symbols used in plumbing and mechanical drawings, and reviews isometric, oblique, orthographic, and schematic drawings. Requires trainees to render plumbing drawings and to recognize how code requirements apply to plumbing drawings.

Plastic Pipe and Fittings (12.5 Hours) Introduces 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 the manufacturer's instructions and applicable codes. Discusses pressure testing of plastic pipe once installed.

Copper Tube and Fittings (12.5 Hours) Discusses sizing, labeling, and applications of copper pipe and fittings, and reviews the types of valves that can be used on copper pipe systems. Explains proper methods for cutting, joining, and installing copper pipe. Addresses insulation, pressure testing, seismic codes, and handling and storage requirements.

Cast-Iron Pipe and Fittings (12.5 Hours) Introduces hub-and-spigot and nohub cast-iron pipe and fittings and their applications in 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 Hours) 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 Hours) Discusses the proper applications of code-approved fixtures in plumbing installations. Reviews the different types of fixtures and the materials used in them. Covers storage, handling, and code requirements.

Introduction to Drain, Waste, and Vent (DWV) Systems (10 Hours) Explains how DWV systems remove waste safely and effectively. Discusses how system components, such as pipe, drains, traps, and vents work. Reviews drain and vent sizing, grade, and waste treatment. Discusses how building sewers and sewer drains connect the DWV system to the public sewer system.

Introduction to Water Distribution Systems (10 Hours) 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 systems that trainees will install on the job.

VIII. Concrete (85 hours)

Introduction to Concrete Construction and Finishing (10 Hours) Provides an introduction to the methods and procedures used in concrete finishing. Introduces terms of the trade and tools and equipment used to place, finish, and cure concrete. Explains methods and techniques for constructing concrete structures.

Safety Requirements (5 Hours) Explains safety requirements for concrete construction and finishing. Provides information on OSHA requirements with regard to hazard communication, fall protection, and use of personal protective equipment. Covers topics such as general work site safety, use of chemicals, and safe use of hand and power tools.

Properties of Concrete (10 Hours) Introduces the properties of concrete and the components that make up the concrete mixture. Describes chemical and physical properties of cement, aggregate, and admixtures. Explains basic tests used to determine properties such as slump and ultimate strength.

Handling and Placing Concrete (20 Hours) Covers tools, equipment, and procedures for safely handling, placing, and finishing concrete. Describes joints made in concrete structures and the use of joint sealants.

Tools and Equipment (7.5 Hours) Describes tools and equipment used in the production, placing, and curing of concrete. Explains safe operation and maintenance requirements. Provides opportunities for hand tool operation and demonstration of larger pieces of power equipment.

Preparing for Placement (12.5 Hours) Details the methods and procedures used to prepare for placing concrete. Covers site layout, forms requirements, and subgrade preparation. Describes



requirements for joints and reinforcement. Explains how to order concrete from a mixing or batch plant.

Placing Concrete (12.5 Hours) Presents requirements and methods for properly placing concrete. Includes information on conveying and placing fresh concrete using equipment such as wheelbarrows, pumps, and conveyors. Describes techniques for spreading, consolidating, and striking off concrete.

Finishing, Part One (20 Hours) Describes basic finishing techniques for slabs and other horizontal structures. Explains the proper use of floats, trowels, edgers, and groovers. Discusses requirements for cutting joints using different types of saws. Provides hands-on practice for finishing concrete slabs.

Curing and Protecting Concrete (5 Hours) Introduces methods and procedures used in curing and protecting concrete. Covers curing commonly performed for both horizontal and vertical placement. Describes techniques for protecting concrete during hot and cold weather.

Trenching and Excavating (15 Hours) Provides an introduction to working in and around excavations, particularly in preparing building foundations. Describes types and bearing capacities of soils; procedures used in shoring, shielding, and sloping trenches and excavations; trenching safety requirements, including recognition of unsafe conditions; and mitigation of groundwater and rock when excavating foundations.

Reinforcing Concrete (15 Hours) Explains the selection and uses of different types of reinforcing materials. Describes requirements for bending, cutting, splicing, and tying reinforcing steel and the placement of steel in footings and foundations, walls, columns, and beams and girders.

Foundations and Slabs-On-Grade (20 Hours) Covers basic site layout safety, tools, and methods; layout and construction of deep and shallow foundations; types of foundation forms; layout and formation of slabs-on-grade; and forms used for curbing and paving.

Introduction to Troubleshooting (5 Hours) Describes problems of placing, finishing, and curing. Defines symptoms of problems and discusses their causes. Presents ways to reduce or eliminate these problems.

Quality Control (10 Hours) Introduces the ideas and tasks related to sampling, testing, and inspecting concrete and its component materials. Describes types of specifications, along with the standard procedures for sampling and testing concrete mix. Covers inspection procedures for forms, construction methods, and finishing.

IX. Ironwork (172.5 hours)

Introduction to the Trade (5 Hours) Discusses the historical development of the ironworking trade. Explains personal qualities that contribute to successful employment. Describes the organization and purpose of apprenticeship training, and the safety obligations of the employer



and employee.

Trade Safety (12.5 Hours) Describes the consequences of on-the-job accidents and the responsibilities of OSHA. Identifies potential ironworker health and safety hazards and safe work practices around cranes. Explains the safe use of personnel lifts. Discusses the safe use and operation of aerial platforms, hoists, and fall protection systems.

Tools and Equipment of the Trade (10 Hours) Identifies safety tools and equipment. Describes the proper use of hand and power tools. Identifies power sources for ironworking tools.

Fastening (5 Hours) Explains how to recognize A-325 and A-490 bolts, washers, and nuts. Describes how to correctly tension bolts and explains procedures for calibrated wrench and turn-of-nut tightening methods.

Mobile Construction Cranes (10 Hours) Identifies common lifting equipment and construction cranes. Describes how to use crane manuals, perform record keeping, and follow safety requirements. Provides procedures for assembling construction cranes.

Rigging Equipment (10 Hours) Describes the use and inspection of equipment and hardware used in rigging. Describes slings and explains how to determine sling capacities and angles. Covers the selection and inspection of rigging equipment, including block and tackles, chain hoists, come-alongs, jacks, and tuggers.

Rigging Practices (15 Hours) Identifies the site and environmental hazards associated with rigging. Explains how to attach rigging hardware for routine lifts and identify the components of a lift plan. Describes how to perform sling tension calculations and determine the weight of beams and basic weight estimation.

Trade Drawings One (12.5 Hours) Identifies the materials used in steel-framed buildings. Explains how to read basic structural blueprints.

Structural Ironworking One (7.5 Hours) Identifies the types of construction that utilize structural steel, the components of the structures, and the process involved in erecting a steel structure. Explains the principles of structural stresses and the requirements of bolted connections.

Plumbing, Aligning, and Guying (5 Hours) Describes the purpose and function of aligning and plumbing steel structures, the tools that are used, and the procedures for performing the plumbing and aligning. Identifies and explains column base and baseplate components and foundation failures.

Oxyfuel Cutting (17.5 Hours) Explains the safety requirements for oxyfuel cutting. Identifies oxyfuel cutting equipment and setup requirements. Explains how to light, adjust, and shut down oxyfuel equipment. Trainees will perform cutting techniques that include straight line, piercing, bevels, washing, and gouging.



Introduction to Arc Welding (22.5 Hours) Identifies welding equipment and processes. Describes safety precautions associated with arc welding. Explains how to identify weld joints, their dimensions, and applications from welding symbols and drawings. Describes how to set up and use SMAW equipment and explains the governing welding codes.

Bar Joists and Girders (5 Hours) Explains how to recognize types of bar joists and how they are designated. Describes the proper procedures for rigging and storing steel joists. Explains the use of joist girders in steel joist construction systems and the proper erection procedures for bar joists. Includes OSHA Subpart R.

Metal Decking (10 Hours) Identifies decking types and profiles and how decking is packaged, shipped, and stored. Describes erecting decking and job-site safety. Discusses the effects of deck penetrations and damage. Includes OSHA

Subpart R. Field Fabrication (15 Hours) Identifies the safety hazards associated with field fabrication. Describes how to use common layout tools. Explains how to fabricate angle iron, channel, T-shapes, and W-shapes to given dimensions.

Weld Quality (10 Hours) Identifies the codes that govern welding, including marine welds. Identifies and explains weld imperfections and causes. Describes non-destructive testing, visual inspection criteria, welder qualification tests, and the importance of quality workmanship.

X. Green Construction (219.5 hours)

Introduction to Alternative Energy (25 Hours) Identifies the need for alternative energy development. Describes the contributions and potential of individual alternative energy sources. Also covers the present U.S. electrical grid and issues affecting

Your Role in the Green Environment (LEED V4) (15 Hours) Geared to entry-level craft workers, Your Role in the Green Environment provides pertinent information concerning the green environment, construction practices, and building rating systems. This edition has been updated to reflect LEED v4 with emphasis on standards for building design and construction. The updated content features contemporary issues such as net zero buildings and an expanded focus on issues relevant to international construction.

Solar Power (25 Hours) Describes solar photovoltaic (PV) power and how it is harnessed. Identifies the advantages and disadvantages of solar energy. Discusses the past, present, and future.

Introduction to Solar Photovoltaics (40 Hours) Covers the basic concepts of PV systems and their components, along with general sizing and electrical/mechanical design requirements. Provides an overview of performance analysis and troubleshooting. Successful completion of this module will help prepare trainees for the North American Board of Certified Energy Practitioners (NABCEP) PV Entry Level Exam.



Site Assessment (10 Hours) Explains how to determine customer needs, assess site-specific safety hazards, conduct a site survey, and identify a suitable location for the PV array and other system components. Also explains how to acquire and interpret site solar radiation and temperature data.

System Design (25 Hours) Describes system design considerations, including array configurations, component selection, and wire sizing. Covers bonding, grounding, and the selection of overcurrent protection and disconnects.

System Installation and Inspection (60 Hours) Explains how to use the information from the site assessment and system design documents to safely install a photovoltaic array and other system components.

Maintenance and Troubleshooting (10 Hours) Covers basic system performance monitoring and troubleshooting procedures, including recordkeeping requirements.

Making a Home Greener (30 mins): Understanding the parts of a home that can be developed to make it greener.

Practical Aspects of Incorporating Occupant Considerations into Building Design and Operations (1 hour): This course explores the role of the occupant in the building design process.

Designing & Detailing Exterior Wall for Moisture Control (30 mins): This course will cover the 4 Ds of moisture management.

Ethics and the Environment (1 hour): Understanding an Architect's Intent, Process, and Impact on Others: With any project, an architect must consider one's intent, all stakeholders, and the project's process in relation to its impact on the environment today and for future generations.

American Hardwoods and their Role in Carbon Neutral Design (1 hour): The presentation is about American Hardwoods and how incorporating them more aggressively into your designs will help the environment. Throughout today's presentation references made to American Hardwoods pertain to hardwood species indigenous to the continental United States.

Daylight and Energy: Designing with insulated glass units (IGUs) (1 hour): This course will explain the benefits of designing with Insulated Glass Units (IGUs) with integrated cord-free louvers including controlling heat gain and optimizing occupant health

Sustainability and Window Materials 101 (30 mins): Windows play a significant role in the function and comfort of a building, from providing natural light and ventilation, to adding architectural features. Windows also play a large part in the sustainability of a structure.

Introduction to Water Source Heat Pump Systems (30 mins): Explain the advantages of heating and cooling with water source heat pumps, concept and major components, selection drivers and loop types.



Electrochromic Glazing - Dynamic Control of Solar Energy: (1 hour): An Introduction to Dynamic Glazing: Improving the human experience in buildings with electrochromics. This course details how electrochromic glazing can be used to meter and control the amount of light and solar energy entering a building to provide optimum daylighting and energy

Sustainable HVAC: Using Air Movement in Air Conditioned Building (1 hour): By reconsidering the relationship between air conditioning and elevated air speed, design professionals can affect meaningful change in building sustainability and comfort.

Building Envelope Fundamentals and Design Solutions with Insulated Metal Panels (1 hour): This course reviews the building envelope fundamentals and the design solutions using insulated metal panels (IMPs).

Today's Waste Collection: Environment-Conscious and Cost-Effective Solutions (1 hour): This course will provide new solutions to solid-waste management in multi-residential communities and urban developments.

XI. Project Management (117 hours)

Introduction to Project Management (2.5 Hours) Introduces the role and responsibilities of project management, including technical and management skills. Presents an overview of the phases in a construction project and describes alternate project delivery methods.

Safety (15 Hours) Stresses the importance of job-site safety and identifies the project manager's duties and responsibilities regarding safety. Covers loss prevention and creating a zero accident work environment. Presents several checklists as references.

Interpersonal Skills (12.5 Hours) Discusses the values and expectations of the workforce, building relationships, and satisfying stakeholders. Describes the principles of effective communication, applying the management grid, and using relationship skills to create a leadership environment. Discusses behavioral and nondiscriminatory interviewing, and professional development of personnel. Covers issues surrounding disabled workers, sexual harassment, gender and minority discrimination, child labor laws, antitrust laws, and copyright infringement.

Issues and Resolutions (15 Hours) Describes the key elements of successful negotiations and negotiating techniques. Explains how to recognize nonverbal signals, use negotiating tools, and apply conflict resolution strategies. Identifies symptoms and barriers to solving project-related problems and applying problem-solving techniques, brainstorming, and identifying root cause consequences.

Construction Documents (10 Hours) Emphasizes the importance of documentation and explains the types of documents, drawings, and specifications used on a project, and the best practices regarding revisions, obsolete drawings, and safeguarding drawing sets. Explains methods of



obtaining work in the industry and types of contracts and insurance requirements. Describes the change order process and the documents required to close out a project.

Construction Planning (10 Hours) Discusses the importance of formal job planning and creating a performance-based work environment. Discusses the Work Breakdown Structure (WBS) as the foundation that identifies deliverables, tasks, and time. Introduces the basics of quality control and defines the roles and responsibilities of an effective team and how to allocate resources.

Estimating and Cost Control (15 Hours) Emphasizes the importance of accurate estimating and summarizes the estimating process and the steps in developing an estimate, and the difference between parametric estimating and analogous estimating. Defines the purpose of a cost control methodology, explains how to perform simple cost analysis, and covers the project manager's role in controlling cost and tracking rework cost.

Scheduling (15 Hours) Explains the basics of scheduling from simple to-do lists through bar charts, network diagrams, and methods of managing resources. Discusses the importance of formal schedules, job planning, and establishing priorities. Describes alternative scheduling methods.

Resource Control (10 Hours) Identifies resources that must be controlled, factors that affect production control, and production control standards. Explains the project manager's role in the process. Defines production and productivity, and describes how to evaluate and improve production control and productivity.

Quality Control (5 Hours) Defines quality control and quality assurance, and stresses management's concerns about quality. Explains project quality management and how to develop an effective quality control plan. Discusses how to identify, assess, and measure weaknesses to avoid rework.

Continuous Improvement (5 Hours) Describes the project manager's role in creating a culture of continuous improvement. Explains the fundamentals of a continuous improvement program and how to identify the critical problems and processes that require improvement, implement a continuous improvement process, and measure results. Emphasizes the importance of satisfying internal and external stakeholders.

Technology in Construction (2 hours): The use of technology in construction as a tool to streamline, track, and complete projects in an efficient and speedy manner. Unveiling of the tool of the century, MOBU Quick Project App ©.

XII. Entrepreneur School: Business Bridge program designed to prepare students to start their own business. We will aid in the startup process, provide ongoing support, and joint venture with all participants (42 hours)

Week 1: Idea Conceptualizing (4 hours): This first class is designed for students to start the process of idea to paper. With any great business there was once a thought. This is the most



crucial class for our students. Our students will use this time to think of ideas for products/services that will kick start their entrepreneurial dreams. Staff will help students to brainstorm and find multiple ideas to start their journey of entrepreneurship.

Week 2: Idea Feasibility (4 hours): This class is designed to help them understand whether or not their business is profitable and feasible to their target audience. We will come up with usage for the ideas, pros and cons for their idea, and begin doing market research. This is a strict devil's advocate approach where staff will challenge the students thought processes behind their ideas. Students should be ready to defend or back down after hearing logical arguments and peer feedback.

Week 3: Identifying Uniqueness (4 hours): This class will help the students identify if their idea is at all unique or different from competitors. We will help them create a name for the business and see if there are competitors with similar names or functions. This will be the day they identify their name, website name, company purpose. They will learn to effectively communicate their ideas in a 15 second pitch ready to be shared with anyone.

Week 4: Business Plan writing (4 hours): This is the pivotal point for our students. This class will allow for them to start writing their plan. All subsequent weeks will break down each aspect of the business plan and help the children understand how each part is important in building a long term future. we will discuss components of the business plan in detail and give the students an outline to use for their homework assignment to start thinking about it.

Week 5: Company Overview and Industry analysis (4 hours): This class will provide an in-depth description of their products/services, emphasizing the specific benefits. An explanation of the market role of your product/service and advantages it has over the competition. Information about the product or service's life cycle. Relevant copyright, patent or trade secret data. Research and development activities that may lead to new products and services.

Week 6: Customer analysis (4 hours): A sketch of targeted customer segments, including size and demographics of the groups. An industry description and outlook, including statistics. Historical, current and projected marketing data for your product/services.

Week 7: Competitive Analysis (4 hours): A detailed evaluation of your competitors, highlighting their strengths and weaknesses.

Week 8: Marketing Plan (4 hours): A sketch of targeted customer segments, including size and demographics of the groups. An industry description and outlook, including statistics. Historical, current and projected marketing data for your product/services along with channels that best can bring your idea to market.

Week 9: Operations Plan (4 hours): An explanation of how you will reach target customers and penetrate the market. Details about pricing, promotions and distribution. An explanation of how the company will function, following the operations' cycle from acquisition of supplies



through production to delivery. Information on sources of labor and number of employees. Data on operating hours and facilities.

Week 10: Management Team (4 hours): An organizational chart with descriptions of departments and key employees. Information about owners, including their names, percentage of ownership, extent of involvement within the company and a biography listing their background and skills. Profiles of your management team, including their names, positions, main responsibilities and past experience. List of any advisors, such as board members, accountants and attorneys

Week 11: Financial Plan and Executive Summary (2 hours): Historical financial data, if you own an established business, including income statements, balance sheets and cash flow statements for the past three to five years. Prospective financial information, including forecasted income statements, balance sheets, cash flow statements and capital expenditure budgets for the next five years. A brief analysis of your financial data, featuring a ratio and trend analysis for all financial statements.

Executive Summary (4 hours): Participants will summarize their plan in one page. Your business name and location. The products and/or services offered. Summary of financials, problem being solved and company's mission statement. The purpose of your plan (to secure investors, set strategies, etc.)

Week 12: Graduation and Program Awards: All students will receive plaques for participation, best students top three in class will receive Trophies for various contests throughout program for best written plan, Innovative ideas, and Most determined; to not leave anyone out each student will receive an award best on their best character trait displayed during the program.

TOTAL MINIMUM HOURS 2,646