APPENDIX A
WORK PROCESS SCHEDULE

ON-THE-JOB TRAINING OUTLINE
RELATED INSTRUCTION OUTLINE

Appendix A

WORK PROCESS SCHEDULE

Carpenter

O*NET-SOC CODE: 47-2031.01 **RAPIDS CODE:** 0067

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

APPRENTICESHIP APPROACH

☒ Time-based ☐ Competency-based ☐ Hybrid

TERM OF APPRENTICESHIP

The term of the apprenticeship is 3 years with an OJL attainment of 6,000 hours, supplemented by the minimum required 455 hours of related instruction.

RATIO OF APPRENTICES TO JOURNEYWORKERS

The apprentice to journey worker ratio is: 1 Apprentice(s) to 1 journey worker(s).

APPRENTICE WAGE SCHEDULE

PROBATIONARY PERIOD

Every applicant selected for apprenticeship will serve a probationary period of 90 days.

SELECTION PROCEDURES

Application Procedures

Definitions:

- The Registered Carpentry Apprenticeship program is hereinto referred to as **"the RCA program"**
- The Associated Builders & Contractor of NH/VT (ABC NH/VT) and New Hampshire Homebuilders Association (NHHBA) Registered Carpentry Apprenticeship (RCA) oversite partnership is hereinto referred to as "**the sponsor**"
- All employers referred to in this document are registered under **the sponsor**

A. The employer will post available RCA opportunities on the ApprenticeshipNH website, New Hampshire Works Job Match System, and other web-based job search engines such as Indeed.com. ApprenticeshipNH will notify recognized pre-apprenticeship organizations of current openings.

B. The Community College System of New Hampshire, under the ApprenticeshipNH Initiative, will provide an information session(s), scheduled according to employer need, to discuss the RCA program including expectations of employers, apprentices, the sponsor as well as training provided and OJT requirements.

C. Applications are made available to all persons upon request. Each applicant will receive an application that is identical in form and requirements that is supplied and used by the employer.

D. Applicants who meet minimum requirements will be notified by phone or email and offered the opportunity to interview for the RCA position. Applicants who accept the offer to interview will be further referred to as "candidates" under the selection procedures.

E. Prior to the interview, the employer will provide each applicant with the Apprenticeship Standards, which outlines the RCA program and includes the requirements for on-the-job training (OJT) and related instruction. Applicants are required to review documentation prior to their scheduled interview with the employer. If the applicant has any additional questions on the qualifications or needs additional information, it will be provided by the employer and/or the sponsor.

F. The employer will notify applicants who do not meet the minimum requirements for the RCA by email and/or United States Postal Service.

G. Applications of candidates who do not meet the minimum requirements are stored by the employer in a secure location for five (5) years.

Selection Procedures for Registered Carpentry Apprenticeship (RCA)

The sponsor has adopted the following selection procedures, consistent with the requirements set forth in 29 CFR § 30.10(b):

A. Each employer will establish a standard set of interview questions to be asked of all RCA candidates during the interview process and will conduct all interviews uniformly.

B. Each employer will establish a standardized evaluation process and will use this process uniformly.

C. The employer will schedule interviews based upon their hiring needs. All RCA candidates who have met the minimum qualifications and have submitted the required documents must be notified of the date, time, and place to appear for the interview via email and/or phone.

D. After completing the interview(s) and evaluation of candidates, the designee of the employer, will select the candidate(s) based on the established standardized evaluation criteria and best-fit assessment for the RCA.

E. The employer must give selected candidates 72 hours (or three business days) to respond to the notice of selection indicating their acceptance or denial. Candidate notifications of selection can be submitted via email, in person or phone.

F. Candidates who are not selected for hire into the RCA program must be notified within two weeks from their last interview by email and/or United States Postal Service.

G. Records of all candidates' interview notes, summary of responses and related application documentation, regardless of hiring status into the RCA program, must be kept on file in a secure location for five (5) years by the employer.

Appendix A

ON-THE-JOB TRAINING OUTLINE

Carpenter

O*NET-SOC CODE: 47-2031.01 **RAPIDS CODE:** 0067

Occupational Description: Construct, erect, install, or repair structures and fixtures made of wood and comparable materials, such as concrete forms; building frameworks, including partitions, joists, studding, and rafters; and wood stairways, window and door frames, and hardwood floors. May also install cabinets, siding, drywall, and batt or roll insulation. Includes brattice builders who build doors or brattices (ventilation walls or partitions) in underground passageways.

Work Process Schedule	**Approximate Hours:**	6,000

Foundations, walls, and floors	1125

- Laying out and leveling
- Building and placing straight concrete forms
- Lining up and bracing concrete walls and columns
- Laying out footings
- Building irregular concrete forms
- Building forms for concrete stairways
- Laying out building lines
- Safety

Framing	600

- Laying out and framing sills and girders
- Framing and setting floor joists
- Erecting wall and partitions
- Lining up and bracing walls and partitions
- Installing sheathing and plaster grounds
- Building's Staging's
- Laying out walls and partitions
- Safety

Roofs	600

- Framing and setting common rafters
- Framing and setting valley rafters
- Framing and setting hip rafters
- Framing and setting jack rafters
- Applying sheathing, composition shingles, and other types of roof coverings
- Safety

Exterior Mill Work	750

- Determining use of tools, materials, and equipment
- Operating skill saw, electric drill, and sander
- Setting up and operating bench saw
- Safety

Interior Wall Coverings	375

- Applying wood coverings
- Applying composition, sheet rock, or fiberboard
- Installing baseboards
- Safety

Floors	375

- Laying sub floors
- Laying hardwood floors
- Erecting forms for concrete
- Safety

Stairs	375

- Laying out and cutting stair horse for various types of stairways
- Laying out and cutting various threads
- Installing railings
- Safety

Interior Finish	750

- Cutting and fitting base
- Cutting and fitting molding
- Setting doorjambs
- Fitting and hanging windows
- Fitting and fastening hardware
- Fitting and hanging doors
- Safety

Miscellaneous	1050

- Building walkways
- Erecting scaffolding
- Making temporary sheds
- Making miscellaneous repairs and additions
- Erecting miscellaneous types of concrete forms
- Safety

Total Hours	**6000**

Appendix A

RELATED INSTRUCTION OUTLINE
Carpenter
O*NET/SOC CODE: 47-2031.01 **RAPIDS CODE: 0067**

Manchester Community College/NCCER

Class Name	Total Hours
Module 1	
Orientation to the Trades	2.5
Basic Safety	12.5
Introduction to Construction Math	10
Introduction to Hand Tools	15
Introduction to Power Tools	12.5
Introduction to Construction Drawings, Specifications, and Layout	25
Introduction to Basic Rigging	7.5
Basic Communications	
Basic Employability Skills	17.5
Introduction to Material Handling	
Building Materials, Fasteners and Adhesives	25
Introduction to Heavy Construction Equipment	7.5
Basic Stair Layout	12.5

Module II	
Floor Systems	2.5
Wall Systems	10
Ceiling Joists and Roof Framing	47.5
Introduction to Building Envelope Systems	12.5
Introduction to Masonry	12.5
Electrical Safety	12.5
Introduction to HVAC	10
Introduction to Painting (Introduction to Paints and Coatings)	10
Introduction to Drain, Waste, and Vent (DWV) Systems	10
Module III	
Cold-Formed Steel Framing Commercial and Residential	15
Thermal and Moisture Protection Commercial and Residential	7.5
Doors and Door Hardware Commercial and Residential	20
Drywall Finishing	26
Window, Door, Floor & Ceiling Trim Commercial and Residential	17.5
Cabinet Installation Commercial and Residential	25
Plastic Pipe and Fittings	10
Copper Tube and Fittings	12.5
Introduction to Plumbing Fixtures	12.5
Introduction to Cost Estimating	7.5
Total Hours	455

Orientation to the Trades

Identify the career and entrepreneurial opportunities within the carpentry trade.

a. Identify the training opportunities within the carpentry trade.

Identify the skills, responsibilities, and characteristics needed to be a successful carpenter.

a. Identify the skills needed to be a successful carpenter.
b. Identify the responsibilities of a successful carpenter.
c. State the personal characteristics of a successful carpenter.

Summarize how to be connected to the industry through an organization like SkillsUSA.

a. Describe the program, curriculum, and SkillsUSA Championships.
b. State the benefits from being a SkillsUSA member.
c. List the seven goals of the SkillsUSA Program of Work.

Explain the importance of safety in the construction industry, and describe the obligations of the contractor, subcontractors, and you to ensure a safe work environment.

a. Describe the OSHA Outreach Training Program.
b. Explain hazard recognition and define your role in it.

Basic Safety-Includes OSHA 10-hour Outreach for Construction

Explain the benefits of safety, the cost of workplace incidents, and ways to reduce related hazards.

a. Describe the types of workplace incidents along with physical and monetary impacts.
b. Summarize the causes and consequences of common incidents.
c. Explain how to recognize, evaluate, and control workplace hazards.

Describe common fall hazards and methods to prevent them.

a. Summarize the most common types of construction fall hazards.
b. Describe components of effective fall arrest systems and how they prevent or halt falls.
c. Explain how to use ladders and stairs safely.
d. Identify key steps to ensuring scaffolds are assembled and used safely.
e. Recognize and avoid struck-by and caught-inbetween hazards.
f. Describe struck-by hazards and how to avoid them.
g. Describe common caught-in/caught-between hazards and steps that can prevent them.

Identify common electrical hazards and how to avoid them.

a. Summarize basic job-site electrical safety guidelines.
b. Explain the importance of disabling equipment as well as basic lockout/tagout procedures.

Associate personal protective equipment (PPE) with the hazards they reduce or eliminate.

a. Explain how PPE is used to protect craftworkers from different types of injuries.

b. Explain how respirators protect craftworkers from respiratory dangers.

Describe safety practices used with other common job-site hazards.

a. List other types of hazards craftworkers may encounter.
b. Describe common environmental hazards and how craftworkers should respond to them.
c. Summarize hazards associated with hot work.
d. Identify fire hazards and describe basic fire-fighting procedures.
e. Name different types of confined spaces and how to avoid related hazards.

Introduction to Construction Math

Identify whole numbers and solve basic arithmetic problems with them.

a. List the key qualities of whole numbers and summarize their place values.
b. Add and subtract whole numbers.
c. Multiply and divide whole numbers.

Name fraction types and calculate with fractions.

a. Define equivalent fractions and calculate their lowest common denominators.
b. Define improper fractions and convert them into mixed numbers.
c. Add and subtract fractions.
d. Multiply and divide fractions.

Identify decimal numbers and calculate with them.

a. List the key qualities of decimal numbers and summarize their place values.
b. Add, subtract, multiply, and divide decimal numbers.
c. Convert between decimals, fractions, and percentages.
d. Name the common length-measuring tools and use them to measure lengths accurately.
e. Describe English and metric rulers, using them correctly to measure lengths.
f. Describe English and metric measuring tapes, using them correctly to measure lengths.

Name common length, weight, volume, and temperature units in both the inch-pound and metric systems and convert them into other comparable units.

a. List and convert between common inch pound and metric length units.
b. List and convert between common inch pound and metric weight units. c. List and convert between common inch pound and metric volume units.
c. List and convert between common inch pound and metric temperature units.

Classify angles and geometric shapes, as well as calculating their areas or volumes.

a. List each angle type.
b. Name common geometric shapes and summarize their qualities.
c. Calculate the area of two-dimensional shapes.
d. Calculate the volume of three-dimensional shapes.

Introduction to Hand Tools

Name common hand tools and state how to use them.

a. Identify various hammers and demolition tools and explain how to use them.
b. Describe chisels and punches and how they are used.
c. Match screwdrivers to the appropriate hardware.
d. Differentiate between non-adjustable, adjustable, and socket wrenches.
e. Describe various types of pliers and explain how they are used.

Identify common measurement and layout tools and describe how to use them.

a. Explain how to use a variety of measuring tools.
b. Define various types of levels and layout tools and indicate how they are used.

Identify and describe other hand tools common to shops and job sites.

a. Differentiate between various handsaws and their designated applications.
b. Identify common clamp designs.
c. Explain how different files and utility knives are used with various materials.
d. Describe shovels and picks and the tasks for which each one is best suited.

Introduction to Power Tools

Identify and explain how to use various types of power drills and impact wrenches.

a. Summarize basic power tool safety guidelines.
b. Identify common power drills and bits and explain how to use them.
c. Describe the difference between hammer drills and impact drivers.
d. Identify pneumatic drills and impact wrenches and explain how to use them.

Identify and explain how to use various types of power saws.

a. Explain how to use a circular saw and identify different types of blades.
b. Differentiate between jigsaws and reciprocating saws and explain how to use them.
c. Explain how to use a portable band saw.
d. Describe the difference between miter saws and cutoff saws.
e. Explain how to use table saws and describe the types of jobs for which they are best suited.

Describe the types of jobs best suited to grinders and oscillating multi-tools.

a. Explain how to use various types of grinders.
b. Identify grinder accessories and the jobs for which they are used.
c. List the type of jobs that can be performed using an oscillating multi-tool.

Identify and explain how to use miscellaneous power tools.

a. Discuss the hazards of using power nailers.
b. Describe jobs that can be performed with hydraulic jacks.

Introduction to Construction Drawings, Specifications, and Layout

Describe the types of drawings usually included in a set of plans and describe the information found on each type.

a. Identify the different types of lines used on construction drawings.
b. Identify selected architectural symbols commonly used to represent materials on plans.
c. Identify selected electrical, mechanical, and plumbing symbols commonly used on plans.
d. Identify selected abbreviations commonly used on plans.
e. Describe the methods of dimensioning construction drawings.
f. List the various types of construction drawings and describe each.

State the purpose of written specifications.

a. Describe how specifications are organized.
b. Explain the importance of building codes in construction.

Identify the methods of squaring a building.

Introduction to Basic Rigging

Identify and describe various types of rigging slings, hardware, and equipment.

a. Identify and describe various types of slings.
b. Describe how to inspect various types of slings.
c. Identify and describe how to inspect common rigging hardware.
d. Identify and describe various types of hoists.
e. Identify and describe basic rigging hitches and the related Emergency Stop hand signal

Basic Communication Skills

Describe the communication, listening, and speaking processes and their relationship to job performance.

a. Describe the communication process and the importance of listening and speaking skills.
b. Describe the listening process and identify good listening skills.
c. Describe the speaking process and identify good speaking skills.

Describe good reading and writing skills and their relationship to job performance.

a. Describe the importance of good reading and writing skills.
b. Describe job-related reading requirements and identify good reading skills.
c. Describe job-related writing requirements and identify good writing skills.

Basic Employability Skills

Describe the opportunities in the construction businesses and how to enter the construction workforce.

a. Describe the construction business and the opportunities offered by the trades.
b. Explain how workers can enter the construction workforce.

Explain the importance of critical thinking and how to solve problems.

a. Describe critical thinking and barriers to solving problems.
b. Describe how to solve problems using critical thinking.
c. Describe problems related to planning and scheduling.

Explain the importance of social skills and identify ways good social skills are applied in the construction trade.

a. Identify good personal and social skills.
b. Explain how to resolve conflicts with co-workers and supervisors.
c. Explain how to give and receive constructive criticism.
d. Identify and describe various social issues of concern in the workplace.
e. Describe how to work in a team environment and how to be an effective leader.

Introduction to Material Handling

Identify the basic concepts of material handling and common safety precautions.

a. Describe the basic concepts of material handling and manual lifting.
b. Identify common material handling safety precautions.
c. Identify and describe how to tie knots commonly used in material handling.

Identify various types of material handling equipment and describe how they are used.

a. Identify non-motorized material handling equipment and describe how they are used.
b. Identify motorized material handling equipment and describe how they are used.

Building Materials Fasteners and Adhesives

Identify various types of building materials and describe their uses.

a. State the uses of various types of hardwoods and softwoods.
b. Describe common lumber defects.
c. Identify the different grades of lumber and describe uses for each.
d. Explain how treated lumber differs from nontreated lumber.
e. Describe how plywood is manufactured and cite common applications for plywood on a construction project. f. Identify uses of hardboard.
f. Identify uses of particleboard.
g. Identify uses of high- and medium-density overlay plywood.
h. Describe how oriented strand board differs from particleboard and cite common applications for OSB.
i. Cite common applications for mineral fiberboard.
j. State the uses of various types of engineered lumber.
k. Identify applications for wood I-beams
l. List advantages of glulam lumber over conventional solid lumber.
m. Describe the composition of concrete and explain how hydration occurs.
n. List uses of concrete masonry units for a construction project.

o. Identify where metal framing members may be used in a structure.

List safety precautions associated with building materials.

a. List general safety guidelines for working with building materials.
b. Cite safety precautions for working with wood building materials.
c. Cite safety precautions for working with concrete building materials.
d. Cite safety precautions for working with metal building materials.

Describe the proper method of handling and storing building materials.

a. List basic material-handling guidelines.
b. Describe how to handle and store wood building materials.
c. Describe how to handle and store concrete building materials.
d. Describe how to handle and store metal building materials.

Explain how to calculate the quantities of lumber, panel, and concrete products using industry-standard methods.

a. Calculate lumber quantities.
b. Calculate panel quantities.
c. Calculate the volume of concrete required for rectangular and cylindrical shapes.

Describe the fasteners, anchors, and adhesives used in construction and explain their uses.

a. Identify various types of nails and cite uses for each.
b. Identify applications for staples.
c. Identify various types of screws and cite uses for each.
d. Describe uses for hammer-driven pins and studs.
e. Identify various types of bolts and cite uses for each.
f. Identify various types of mechanical anchors and cite uses for each.
g. Identify various types of bolt anchors and explain how each is installed.
h. Identify various types of screw anchors and cite uses for each.
i. Identify various types of hollow-wall anchors and cite uses for each.
j. List the types of glues and adhesives used in construction.

Introduction to Construction Equipment

State the safety precautions associated with construction equipment.

a. Identify safety precautions when transporting construction equipment.
b. Identify safety precautions related to interlocking and hydraulic systems.
c. Identify safety precautions to observe when fueling construction equipment.
d. Identify safety precautions related to batteries of construction equipment.

Identify and explain the safe operation and use of various pieces of construction equipment.

a. Explain the safe operation of aerial lifts.
b. Explain the safe operation of skid-steer loaders.
c. Explain the safe operation of generators.
d. Explain the safe operation of compressors.

e. Explain the safe operation of compactors.
f. Explain the safe operation of forklifts.
g. Explain the safe operation of backhoes.

Basic Stair Layout

Identify the types of stairways.

a. Identify how residential and commercial stairways differ.

Identify the various components associated with stairs.

Identify terms associated with stair framing.

a. Define headroom.
b. Define stringer and explain when more than two stringers are used.
c. Define treads and risers and explain the importance of uniform tread depths and riser heights.
d. List the minimum stairway width requirements for residential and commercial structures.
e. Describe the difference between handrails and guards.
f. Identify situations that carpenters may be confronted with when framing stairwells.

Describe the procedure used to determine the total rise, number and size of risers, and number and size of treads required for a stairway.

a. Explain how to calculate the riser height, tread depth, and total run for a stairway.
b. Describe how to calculate stairwell opening sizes.

Describe the procedure to lay out and cut stringers, risers, and treads.

a. Explain how to lay out and cut a stringer.
b. Describe how to properly reinforce a stringer.
c. Summarize how concrete stairways are formed.

Floor Systems

Read and interpret specifications and drawings to determine floor system requirements.

a. Explain the importance of specifications.
b. List items commonly shown on architectural drawings.
c. Describe information typically shown on structural drawings.
d. Explain the importance of referencing mechanical, electrical, and plumbing plans.
e. Describe the proper procedure for reading a set of prints.

Identify the different types of framing systems.

a. Describe the general components of a platform-framed structure.
b. List differences between platform framing and balloon framing.
c. Describe the characteristics of post-and-beam framing.

Identify floor system components.

a. Define sill plate and describe its role in floor framing.
b. List and recognize different types of beams and girders and supports.

c. List and recognize different types of floor joists.
d. List and recognize different types of bridging.
e. Explain the purposes of subfloor and underlayment.

Describe the construction methods for floor systems, and identify floor system materials.

a. Describe how to check a foundation for squareness.
b. Name the methods used to lay out and fasten sill plates to the foundation.
c. Describe the proper procedure for installing a beam or girder.
d. Describe how to lay out sill plates and girders for floor joists.
e. Describe how to lay out and install floor joists for partitions and floor openings.
f. Identify different types of bridging and describe how to properly install each type.
g. Describe how to properly install subfloor.
h. Explain how to install joists for projections or cantilevered floors.

Estimate the amount of material needed for a floor assembly.

a. Describe how to estimate the amount of sill plate, sill sealer, and termite shield.
b. Describe how to estimate the amount of beam or girder material.
c. Describe how to estimate the amount of lumber needed for joists and joist headers.
d. Describe how to estimate the amount of bridging required.
e. Describe how to estimate the amount of subfloor material required.

Identify some common alternative floor systems.

Wall Systems

Identify the components of a wall system.

a. Identify methods used to construct corner posts.
b. Describe how to frame partition intersections.
c. Explain the purpose of headers and describe how they are constructed.
d. Describe how metal-framed walls are constructed.

Describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and fire-stops.

a. Describe how to properly lay out a wood frame wall.
b. Explain how to lay out wall openings.

Describe the correct procedure to assemble, erect, and brace exterior walls for a frame building.

a. List the steps involved in assembling a wall.
b. Identify where fire stops are to be installed and explain how they are installed.
c. List the four steps involved in erecting a wall.

Describe wall framing techniques used in masonry construction.

Describe the correct procedure to estimate the materials required to frame walls.

a. Explain how to estimate the amount of lumber required for soleplates and top plates.
b. Describe how to estimate the number of studs required.

c. Explain how to calculate the amount of material needed for a header.
d. Describe how to estimate the amount of diagonal bracing required.

Identify alternative wall systems.

a. Describe how concrete walls are constructed.
b. Explain the difference between standard interior wall systems

Ceiling Joist and Roof Framing

Identify the components of ceiling framing.

a. Describe the correct procedure for laying out ceiling joists.
b. Describe how to cut and install ceiling joists on a wood frame building.
c. Describe how to estimate the number of ceiling joists required for a building.

Identify common types of roofs used in residential construction.

Identify the components and define the terms associated with roof framing.

a. Identify the two types of dormers.
b. Describe how to use a framing square and a Speed Square™ for roof framing.

Describe the methods used to lay out a common rafter.

a. Explain how to lay out rafter locations.
b. Describe how to determine the length of a common rafter.
c. Explain the correct procedure for laying out and cutting a common rafter.

Describe how to erect a gable roof.

a. Describe how to install rafters.

Describe how to frame a basic gable end wall.

a. Describe how to frame a gable overhang.
b. Explain how to frame an opening in a roof.

Recognize the use of trusses in basic roof framing.

a. Identify the various types and components of trusses.
b. Identify the basics of truss installation.
c. Identify the basics of truss bracing.

Describe the basics of roof sheathing installation.

Describe how to perform a material takeoff for a roof.

a. Determine the materials needed for a gable roof.

Introduction to Building Envelope Systems

Identify the components of the building envelope.

a. Describe various ways that air infiltration can be minimized or prevented.
b. Identify various types of fixed, sliding, and swinging windows.

c. Identify the common types of exterior doors and explain how they are constructed

State the requirements for a proper window installation.

a. Explain when jamb extensions are used.
b. Identify common considerations when framing in glass blocks.

State the requirements for a proper door installation.

a. Identify the differences between residential and commercial doors.

Identify the various types of locksets used on exterior doors and explain how they are installed.

Introduction to Masonry

Describe modern masonry materials and techniques.

a. Explain how concrete masonry units (CMUs or block) are used in construction.
b. Explain how clay masonry units (brick) are used in construction.
c. Explain how stone is used in construction.
d. Describe how mortar and grout are used in masonry construction.
e. Describe how wall structures are created using masonry units.

Recognize the basic safety precautions when working with masonry materials.

a. List basic safety practices.
b. Describe personal protective equipment used in masonry.

Explain how to mix mortar and lay masonry units.

a. Explain how to mix mortar.
b. Describe how to lay masonry units.

Describe the skills, attitudes, and abilities needed to be a successful mason.

a. Identify the skills of a successful mason.
b. Identify the attitudes of a successful mason.
c. Identify the abilities of a successful mason.
d. Explore career ladders and advancement possibilities in masonry.

Summarize how to be connected to the industry through an organization like SkillsUSA.

a. Understand the program, curriculum, and SkillsUSA championships.
b. Understand SkillsUSA membership.
c. Understand the National Program of Work Standards.

Electrical Safety

Upon completion of this module, the trainee will be able to do the following:

1. Recognize safe working practices in the construction environment.

2. Explain the purpose of OSHA and how it promotes safety on the job.

3. Identify electrical hazards and how to avoid or minimize them in the workplace.

4. Explain electrical safety issues concerning lockout/tagout procedures, confined space entry, respiratory protection, and fall protection systems.

5. Develop a task plan and a hazard assessment for a given task and select the appropriate PPE and work methods to safely perform the task.

Introduction to HVAC

Explain the basic principles of heating, ventilation, air conditioning, and refrigeration.

a. Explain the principles of heating.
b. Explain the principles of ventilation.
c. Explain the principles of air conditioning.
d. Explain the principles of refrigeration.

Describe the principles that guide HVAC/R installation and service techniques.

a. Identify common safety principles and organizations.
b. Describe the importance of LEED construction and energy management.
c. Describe trade licensing and certification requirements.
d. Identify important codes and permits.

Identify career paths available in the HVAC/R trade.

a. Identify the responsibilities and characteristics needed to be a successful HVAC/R technician.
b. Identify residential, commercial, and industrial career opportunities.
c. Describe opportunities provided by equipment manufacturers.

Introduction to Painting (Intro to Paints and Coatings)

Upon completion of this module, students will be able to

1. Explain the function(s) of pigments, resins, solvents, and additives.

2. Describe the basic differences between water-based and oil-based paints and coatings, including the film-forming mechanisms, advantages, and disadvantages of both types.

3. Use manufacturer's literature and/or product labels to identify coating(s) recommended for use with various substrates (wood, metal, etc.) and exposure conditions. Also identify the recommended method of surface preparation for each coating.

4. Describe the properties and/or functions of paints or coatings. • Properties: – Alkyd – Latex – Epoxy – Urethane (polyurethane) • Functions: – Primers/undercoats – Tie coats – Finish coat – Sealers – Shellacs, varnishes, and lacquers – Stains – Special purpose coatings

5. Demonstrate and/or explain the general methods used for the cleanup and disposal of water-based and oil-based paints.

Introduction to Drain, Waste, and Vent (DWV) Systems

Upon completion of this module, students will be able to

1. Explain how waste moves from a fixture through the drain system to the environment.

2. Identify the major components of a drainage system and describe their functions.

3. Identify the different types of traps and their components, explain the importance of traps, and identify the ways that traps can lose their seals.

4. Identify significant code and health issues, violations, and consequences related to DWV systems.

Cold-Formed Steel Framing-Commercial and Residential
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.
Thermal and Moisture Protection-Commercial and Residential
Covers the selection and installation of various types of insulating materials in walls, floors, and attics. Also covers the uses and installation practices for vapor barriers and waterproofing materials.
Doors and Door Hardware – Commercial and Residential
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.
Drywall Installation-Commercial and Residential
Describes the various types of gypsum drywall, their uses, and the fastening devices and methods used to install them. Contains detailed instructions for installing drywall on walls and ceilings using nails, drywall screws, and adhesives. Also discusses fire- and sound-rated walls.
Drywall Finishing
Describes the materials, tools, and methods used to finish and patch gypsum drywall. Also discussed automatic and manual taping and finishing tools.
Window, Door, Floor and Ceiling Trim-Commercial and Residential
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-Commercial and Residential
Provides detailed instructions for the selection and installation of base and wall cabinets and countertops

Plastic Pipe and Fittings

Identify the types, uses, and properties of plastic pipe and fittings.

a. Identify the types of plastic pipe and their uses.
b. Describe the sizing and labeling of plastic pipe.
c. Describe the different types of fittings used on plastic pipe.
d. Identify storage and handling requirements for plastic pipe

Describe the different methods for joining plastic pipe.

a. Describe how to measure and cut plastic pipe.
b. Describe how to join PVC and CPVC pipe.
c. Describe the installation procedures for PVC bell-and-spigot pipe.
d. Describe the methods for joining PEX and PE tubing.

Describe the methods used to support and test plastic pipe.

a. Describe the hangers and fasteners used to support pipe.
b. Explain methods of pressure testing plastic pipe.

Copper Tube and Fittings

Identify the types, uses, and properties of copper tube and fittings.

a. Identify the types of copper tube and their uses.
b. Describe the sizing and labeling of copper tube.
c. Describe the different types of fittings used on copper tube.
d. Identify storage and handling requirements for copper tube.

Describe the different methods for cutting and bending copper tube.

a. Explain the tools and methods used to measure copper tube.
b. Explain the tools and methods used to cut copper tube.
c. Describe the tools and methods used bend copper tube.
d. Describe the different methods used to join copper tube.

Describe the methods used to install and test copper tube.

a. Describe the hangers and fasteners used to support copper tube.
b. Explain the insulation requirements for copper tube.
c. Explain methods of pressure testing copper tube systems.

Introduction to Plumbing Fixtures

Identify and describe the various plumbing fixtures.

a. Identify and describe the various materials used in making plumbing fixtures.
b. Identify and describe common bathroom fixtures.
c. Explain the operating principles of water closets.
d. Identify and describe common kitchen fixtures.
e. Identify and describe other common plumbing fixtures.

Describe the different types of faucets used in plumbing systems.

a. Describe compression and non-compression faucets.
b. Describe kitchen and bathroom fixture faucets.
c. Describe utility faucets.

Introductions to Cost Estimating

1. Construction cost estimating and cost control overview
2. Understanding design in the construction industry
3. Introduction to the types of cost estimates
4. Quantity take-off and measurement
5. Pricing
6. Building the estimate
7. Procurement
8. Post contract and cost estimation within a project
9. Construction cost control methods
10. Earned Value method
11. Close out period
12. Cost estimation in practice
13. Project cash flow
14. Technology trends in cost estimating and cost control