

## NCCER CARPENTRY CURRICULUM

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

### CORE CURRICULUM – SEMESTER ONE

*The core curricula provides a basic introduction to construction work for all crafts. The core curriculum consists of 9 modules taught through in-person instruction and supplemented by online programming.*

#### **Basic Safety**

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 (PPE), 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.

#### **Introduction to Construction Math**

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**

Introduces common hand tools used in a variety of construction crafts. Identifies tools and how to safely use them. Proper hand tool maintenance is also presented.

#### **Introduction to Power Tools**

Identifies and describes the operation of many power tools common in the construction environment. Provides instruction on proper use, as well as on safe-handling guidelines and basic maintenance.

#### **Introduction to Construction Drawings**

Introduces the basic elements of construction drawings. The common components of drawings are presented, as well as the most common drawing types. The use of drawing scales and how to measure drawings is also covered.

#### **Basic Rigging**

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.

#### **Basic Communication Skills**

Provides good 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 covers proper techniques to use in a variety of different written communication formats.

#### **Basic Employability Skills**

Describes the opportunities offered by the construction trades. Discusses critical thinking and essential problem-solving skills for the construction industry. Also identifies and discusses positive social skills and their value in the workplace.

### **Introduction to Material Handling**

Describes the hazards associated with handling materials and provides techniques to avoid both injury and property damage. Common material-handling equipment is also introduced.

## **CARPENTRY – LEVEL ONE – SEMESTER TWO**

### **Orientation to the Trade**

Reviews the history of the trade, describes the apprentice program, identifies career opportunities for carpentry and construction workers, and lists the responsibilities and characteristics a worker should possess.

### **Building Materials, Fasteners and Adhesives**

Provides an overview of the building materials used in construction work, including lumber, sheet materials, engineered wood products, structural concrete, and structural steel. Also describes the various fasteners and adhesives used in construction work.

### **Hand and Power Tools**

Provides detailed descriptions of the hand tools and portable power tools used by carpenters. Emphasis is on safe and proper operation of tools, as well as care and maintenance.

### **Introduction to Construction Drawings, Specifications, and Layout**

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**

Covers framing basics as well as the procedures for laying out and constructing a wood floor using common lumber as well as engineered building materials.

### **Wall Systems**

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

### **Ceiling Joist and Roof Framing**

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 and valley intersections. Includes the basics of roof sheathing installation.

### **Basic Stair Layout**

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.

### **Introduction to Building Envelope Systems**

Introduces the concepts of the building envelope and explains its components. Describes types of windows, skylights, and exterior doors, and provides instructions for installation.

## CARPENTRY – LEVEL TWO – SEMESTER THREE

### **Commercial Drawings**

Describes the types and uses of drawings prepared for commercial structures. Provides information about the format and content of commercial drawings and their use in conveying specific construction requirements. Describes the standard format for specifications.

### **Roofing Applications**

Covers the common materials used in residential and light commercial roofing, along with the safety practices and application methods for these materials. Includes shingles, roll roofing shakes, tiles, metal, and membrane roofs, as well as the selection and installation of roof vents.

### **Thermal and Moisture Protection**

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.

### **Exterior Finishing**

Covers the various types of exterior siding used in residential construction and their installation procedures, including wood, metal, vinyl and cement board siding.

### **Cold-Formed Steel Framing**

Describes the types and grades of steel framing materials and includes instruction for selecting and installing metal framing for interior walls, exterior nonbearing walls, and partitions.

### **Drywall Installation**

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 covers fire-and sound-rated walls.

### **Drywall Finishing**

Covers the materials, tools, and methods used to finish and patch gypsum drywall. Includes coverage of both automatic and manual taping tools.

### **Doors and Door Hardware**

Covers 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 covers the installation of wooden doors, folding doors, and pocket doors.

### **Suspended Ceilings**

Includes the materials, layout, and installation procedures for many types of suspended ceilings used in commercial construction, as well as ceiling tiles, drywall suspension systems, and pan-type ceilings.

### **Window, Door, Floor, and Ceiling Trim**

Covers the different types of trim used in finish work. Focuses on the proper methods for selecting, cutting, and fastening trim to provide a professional finished appearance.

### **Cabinet Installation**

Provides detailed instructions for the selection and installation of base and wall cabinets and countertops.

## CARPENTRY – LEVEL THREE – SEMESTER FOUR

### **Properties of Concrete**

Describes the properties, characteristics, and uses of cement aggregates and other materials that, when mixed together, form different types of concrete. Covers procedures for estimating concrete volume and testing freshly mixed concrete, as well as methods and materials for curing concrete.

### **Rigging Equipment**

Describes the use and inspection of basic equipment and hardware used in rigging, including slings, wire rope, chains, and attaching hardware such as shackles, eyebolts, and hooks, as well as rigging knots. Explains sling angles. Also covers tuggers, jacks, hoists, and come-alongs.

### **Rigging Practices**

Describes basic rigging and crane hazards and related safety procedures, provides an overview of personnel lifting and lift planning, and introduces crane load charts and load balancing.

### **Trenching and Excavating**

Prepares the trainee for working in and around excavations, particularly in preparing building foundations. It covers types and bearing capacities of soils; procedures used in shoring, sloping, and shielding trenches and excavations; trenching safety requirements, including recognition of unsafe conditions; and mitigation of groundwater and rock when excavating foundations.

### **Reinforcing Concrete**

Explains the selection and uses of different types of reinforcing materials. Describes general requirements for cutting, bending, splicing and tying reinforcing steel, and the placement of the steel in footings, columns, walls, and slabs.

### **Foundations and Slab-on-Grade**

Covers basic site layout safety, tools, and methods; layout and construction of deep and shallow foundations; types of foundation forms; layout and formation of slab-on-grade; and forms used for curbing and paving.

### **Vertical Formwork**

Covers the applications and construction methods for various types of forming and form hardware systems for walls, columns, and stairs, as well as slip forms, climbing forms, and shaft forms. The module also provides an overview of the assembly, erection, and stripping of gang forms.

### **Horizontal Formwork**

Covers the types of elevated decks and the formwork systems and methods used in their construction. It covers joist, pan, metal deck, and flat slab systems and provides instructions for the use of flying forms, as well as shoring and reshoring.

### **Handling and Placing Concrete**

Covers tools, equipment, and procedures for safely handling, placing, and finishing concrete. Describes joints made in concrete structures and the use of joint sealants.

### **Tilt-up Wall Panels**

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 embedment's used to lift and brace the panels. Also covers methods used to create architectural and decorative treatments.

## CARPENTRY – LEVEL FOUR – SEMESTER FIVE

### **Site Layout One – Distance Measurements and Leveling**

Covers the principles, equipment, and methods used to perform the site layout task of distance measurement and differential leveling. Also covers the layout responsibilities of surveyors, field engineers, and carpenters; understanding and using site/plot plan drawings; and methods used for on-site communication.

### **Site Layout Two – Angular Measurement**

Covers the principles, equipment, and methods used to perform the site layout tasks that require making angular measurements. Includes laying out building foundation lines and determining elevations by trigonometric leveling. Covers the use of laser instruments, transits, theodolites, electronic distance measurement, and total stations are covered. Reviews trade mathematics, including geometry and right-angle trigonometry.

### **Advanced Roof Systems**

Covers commercial roofing materials and structures and describes the procedures for installing commercial roofing such as standing seam, lap seam, and built-up roofs.

### **Advanced Wall Systems**

Covers installation of a variety of finishing materials, including paneling, wainscoting, and movable partitions. Also covers installation of curtain walls and fire-rated commercial construction.

### **Advanced Stair Systems**

Provides extensive coverage of the materials and techniques used in finishing wooden staircases. Also covers a variety of stair systems used in commercial construction.

### **Introduction to Construction Equipment**

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 are provided.

### **Introduction to Oxyfuel Cutting and Arc Welding**

Introduces the equipment, procedures, and safety practices used in cutting steel with oxyfuel equipment and in shielded metal arc welding. Includes lab practice in cutting and welding techniques.

### **Site Preparation**

Covers the planning process that precedes the start of work on a construction site, including environmental considerations, personnel issues, access roads, traffic control, permits, site safety, utilities, and crane-related concerns.

### **Fundamentals of Crew Leadership**

Along with the principles of the project planning, scheduling, estimating, and management, teaches basic skills required for supervising personnel. Includes several case studies.



## **THE NCCER PROGRAM**

NCCER (National Center for Construction Education & Research) maintains a portable and widely recognized credentialing and certification system through its Registry. This Registry assures portability of skills by providing transcripts, certificates and wallet cards to students who successfully complete the NCCER Curriculum through an accredited sponsor. These valuable industry credentials benefit students as they seek employment and build their careers. To be entered in NCCER's Automated National Registry, you must complete and sign a Registration and Release Form. This form will be completed on the first night of class in each semester and requires your Social Security Number and your signature.

NCCER has developed a consistent program of accreditation, instructor certification, standardized curriculum, registry, assessment and certification, which are key elements in developing a skilled workforce of craft professionals.

NCCER is the accrediting body for the industry and establishes the benchmark for quality training and assessments. By partnering with industry and academia, NCCER has developed a system for program accreditation that is similar to those found in institutions of higher learning. This process ensures that students receive quality training based on uniform standards and criteria.

The NCCER Curriculum, in cooperation with publishing partner Pearson, has developed and publishes a world-class curriculum created by "Subject Matter Experts" representing contractors and schools from around the country. "Subject Matter Experts" ensure exceptional training programs that meet or exceed national industry standards. The NCCER Curriculum, which includes more than 60 craft areas, is taught worldwide by contractors, associations, construction users, and secondary and post-secondary schools. In addition, multiple State Departments of Education recognize the curriculum along with the U.S. Department of Labor - Office of Apprenticeship.