Residential Construction

Career Cluster	Architecture and Construction
Course Code	17003
Prerequisite(s)	Introduction to Architecture and Construction; Building Trades
Credit	.5-1
Program of Study and Sequence	Foundation Course-Introduction to Architecture and Construction-Building Trades
Student Organization	SkillsUSA
Coordinating Work-Based Learning	Shadowing, speakers, internships, apprenticeships
Industry Certifications	OSHA 10
Dual Credit or Dual Enrollment	TBD
Teacher Certification	Architecture & Construction Cluster Endorsement; Construction Pathway Endorsement; Building Trades Endorsement; 7-12 Technology Education Endorsement
Resources	

Course Description:

Students will gain in depth knowledge of residential construction by identifying and demonstrating correct safety procedures, construction math, blueprint reading and basic surveying techniques. The student will also be able to identify building products, and safely and correctly use various hand/power/pneumatic tools. Concrete construction applications and construction of a residential house will be the main thrust of this course. The student will be able to frame floor, wall and ceiling/roof systems. Once the framing is complete the student will install windows and doors, apply thermal and moisture protection, apply exterior sheathing along with exterior siding and roofing material. Interior work will be performed by installing drywall, installing cabinets and conducting interior finish work. The concept of stair layout and construction will be incorporated in this class. Basic residential electrical and plumbing will be performed as it relates to the necessary requirements in the building process. The National Center for Construction Education & Research (NCCER) competencies/objectives are followed as a resource.

Program of Study Application

This is the fourth course in the suggested sequence of the Residential Construction Program of Study. It is recommended that it is preceded by (1) Foundation Courses, (2) Introduction to Architecture and Construction, and (3) Building Trades; and followed by (5) Capstone Experience.

Course Standards

Indicator # RC 1 Understand and apply industry safety procedures

Webb Level	*Sub-indicator*	*Integrated Content*
Level 1 Recall	RC1.1 Demonstrate proper industry safety standards. Examples: • Complete and or obtain a 10 hour OSHA (Occupational Safety Health Administration) certification • Demonstrate the use of protective clothing and safety equipment • Explain the function of Material Safety Data Sheets (MSDS) • Explain and practice Lockout/Tag out procedures • Know and follow the safety requirements for working in confined spaces • Maintain a written portfolio record of written safety examinations and equipment examinations which the student has passed	Certificate in OSHA training Transfer portfolio records in their MyLife portfolio NCCER Core Basic Safety Module 00101-09

Notes:

Indicator # RC 2: Utilize appropriate industry math skills and formulas

Webb Level	*Sub-indicator*	*Integrated Content*
Level 3 Strategic Thinking	RC2.1 Understand and demonstrate basic math skills. Examples: • Add, subtract, multiply, and divide whole numbers with and without a calculator • Add, subtract, multiply, and divide fractions • Add, subtract, multiply, and divide decimals, with and without a calculator • Convert decimals to percentages and percentages to decimals • Convert fractions to decimals and decimals to fractions • Calculate the necessary units of measure for a project	Develop an awareness of personal abilities, skills, interests and motivations. NCCER Core Introduction to Construction Math Module 00102-09

Notes:

Indicator # RC 3 Understand concepts of blueprint reading and perform basic survey techniques

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC3.1 Demonstrate how to read blueprints. Examples: • Describe the types of drawings usually included in a set of plans and list the information found on each type • Identify the different types of lines used on construction drawings • Identify selected architectural symbols commonly used to represent materials on plans • Identify selected electrical, mechanical, and plumbing symbols • Read and interpret plans, elevations, schedules, sections, and details contained in basic construction drawings • Demonstrate or describe how to perform a quantity takeoff for materials	Suggested Activity: Invite a career professional to visit and explain the use of plans for a structure NCCER Carpentry Level one Introduction to Construction Drawings, Specifications, & Layout Module 27104-13
Level 3 Strategic Thinking	RC3.2 Demonstrate survey techniques and site layout. Examples: • Describe the major responsibilities of the carpenter relative to site layout • Convert measurements stated in feet and inches to equivalent measurements stated in decimal feet, and vice versa • Use taping and/or chaining equipment and procedures to make distance measurements and perform site layout tasks • Use a builder's level or transit and differential leveling procedures to determine site and building elevations • Check and/or establish 90 degree angle using the 3/4/5 rule	Suggested Activity: Invite a career professional to visit and explain the use of plans for a structure The student will learn how to interact and work cooperatively as a team member on a survey crew

Notes:

Indicator # RC 4 Identify and understand wood building materials, fasteners, and adhesives

Webb Level	*Sub-indicator*	*Integrated Content*
Level 1 Recall	RC4.1 Understand and demonstrate the use of wood building materials. Examples: • Explain the terms commonly used in discussing wood and lumber • Identify various types of imperfections that are found in lumber • Interpret grade markings on lumber and plywood • Identify the uses of and safety precautions associated with pressure-treated lumber • State the uses of various types of engineered lumber	Suggested Activities: Take a field trip to a local lumber yard NCCER Carpentry Level one Building Materials, Fssteners, & Adhesives Module 27102-13
Level 1 Recall	RC4.2 Understand and demonstrate the use of fasteners and adhesives. Examples: • List the basic nail and staple types and their uses • Identify the different types of anchors and their uses • Describe the common types of adhesives used in construction work and explain their uses	Suggested Activities: Take a field trip to a local lumber yard NCCER Carpentry Level one Building Materials, Fasteners, & Adhesives Module 27102-13

Notes:

Indicator # RC 5 Identify and correctly use appropriate hand, power and pneumatic tools

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC5.1 Demonstrate safe and proper use of hand tools. Examples: • Identify the hand tools commonly used by carpenters and describe their use • Use hand tools in safe and appropriate manner	Suggested Activities: Have a tool rep. visit the class NCCER Carpentry Level one Hand and Power Tools Module 27103-13
Level 2 Skill/ Concept	RC5.2 Demonstrate safe and proper use of power tools. Examples: • State general safety rules for operating all power tools, regardless of type • State general rules for maintaining all power tools • Identify the portable power tools used and describe their uses • Use portable power tools in a safe and appropriate manner	Suggested Activities: Have a tool rep. visit the class NCCER Carpentry Level one Hand and Power Tools Module 27103-13
Level 2 Skill/ Concept	RC5.3 Demonstrate safe and proper use of pneumatic tools. Examples: • State general safety rules for operating all pneumatic tools • State general rules for maintaining all pneumatic tools • Use pneumatic tools in a safe and appropriate manner	Suggested Activities: Have a tool rep. visit the class NCCER Carpentry Level one Hand and Power Tools Module 27103-13

Notes:

Indicator # RC 6 Integrate concrete technology to achieve thorough construction background

Webb Level	*Sub-indicator*	*Integrated Content*
Level 3 Strategic Thinking	RC6.1 Understand and demonstrate the uses of concrete and reinforcing materials. Examples: • Perform volume estimates for concrete quantity requirements • Identify types of concrete reinforcement bars and describe their use • Identify types of reinforcement bar supports and describe their use • Recognize four kinds of footings – Continuous or spread, stepped, pier, grade beam • Recognize types of concrete placements that require the construction of edge forms – slabs with or without a foundation, driveways, sidewalks, approaches • Explain the purpose of a screed and identify the different types of screeds • Identify and explain the different concrete curing methods • Explain the safety procedures associated with using concrete forms	Suggested Activity: Invite a career professional to visit and explain concrete construction. The student will learn how to interact and work cooperatively as a team member placing rebar and placing concrete NCCER Concrete Finishing Modules 23101, 23102, 23103,23104,23105,23106,23107,23108,23109

Notes:

Indicator # RC 7 Understand and perform framing of flooring, wall, ceiling and roofing systems

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC7.1 Understand and demonstrate framing of flooring systems. Examples: • Read and understand drawings and specifications to determine floor system requirements • Identify floor and sill framing and support members • Name methods used to fasten sills to the foundation • List and recognize different types of floor joists • List and recognize different types of flooring materials • Explain the purposes of subflooring and underlayment • Match selected fasteners used in floor framing to their correct uses • Demonstrate the ability to: layout and construct a floor assembly, install joists for a cantilever floor, install a single floor system using tongue and groove plywood/OSB panels	Suggested Activity: Visit a job-site The student will learn how to interact and work cooperatively as a team member setting floor systems NCCER Carpentry Level one Floor Systems Module 27105-13
Level 3 Strategic Thinking	RC7.2 Understand and demonstrate framing of wall and ceiling systems. Examples: • Identify the components of a wall and ceiling layout • Describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window partition T's bracing, and fire stops • Describe the correct procedure for assembling and erecting an exterior wall • Describe the common materials and methods used for installing sheathing on walls • Layout, assemble, erect, and brace exterior walls for a frame building	Suggested Activity: Visit a job-site The student will learn how to interact and work cooperatively as a team member framing up wall systems NCCER Carpentry Level one Wall Systems Module 27111-13 NCCER Carpentry Level one Ceiling and Roof Framing Module 27112-13

Level 3 Strategic Thinking	RC7.3 Understand and demonstrate framing of a roofing systems. Examples: • Understand the terms associated with roof framing • Identify the roof framing members used in gable and hip roofs • Identify the various types of trusses used in roof framing • Use rafter framing square, speed square, and calculator in laying out a roof • Identify various types of sheathing used in roof construction • Erect a pitched roof using trusses	Suggested Activity: Visit a job-site The student will learn how to interact and work cooperatively as a team member erecting roofing systems NCCER Carpentry Level one Ceiling and Roof Framing Module 27112-13

Notes:

Indicator # RC 8 Understand and demonstrate installation of windows and exterior doors

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC8.1 Understand and demonstrate installation of windows. Examples: • Identify various types of fixed, sliding and swinging windows • Identify the parts of a window installation • State the requirements for a proper window installation • Install a pre-hung window	Suggested Activity: Have a window manufacture rep. visit the class The student will learn how to interact and work cooperatively as a team member installing pre-hung windows NCCER Carpentry Level one Introduction to Building Envelope Systems Module 27109-13
Level 2 Skill/ Concept	RC8.2 Understand and demonstrate installation of exterior doors. Examples: • Identify the common types of exterior doors and explain how they are constructed • Identify the types of thresholds used with exterior doors • Install a pre-hung exterior door with weather-stripping • Identify the various types of locksets used on exterior doors and explain how they are installed • Install a lockset	Suggested Activity: Have a door manufacture rep. visit the class The student will learn how to interact and work cooperatively as a team member installing exterior doors NCCER Carpentry Level one Introduction to Building Envelope Systems Module 27109-136

Notes:

Indicator # RC 9 Identify and perform different exterior finishing methods

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC9.1 Understand and demonstrate installation of exterior finish. Examples: • Describe the purpose of wall insulation and flashing • Identify the types and parts of common cornices • Demonstrate the installation of selected common cornices • Demonstrate lap and panel siding estimating methods • Describe the types and applications of common siding • Install selected types of common siding	Suggested Activity: Have a siding manufacture rep. visit the class Visit a job-site The student will learn how to interact and work cooperatively as a team member installing exterior finish material NCCER Carpentry Level one Introductions to Building Envelope Systems Module 27109-13

Notes:

Indicator # RC 10 Identify and understand different roofing applications

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC10.1 Understand and demonstrate installation of roofing materials. Examples: • Identify the material and methods used in roofing • Explain the safety requirements for roof jobs • Install fiberglass shingles on gable and hip roofs • Close up a valley using shingles • Explain how to make various roof projections watertight when using shingles	Suggested Activity: Have a roofing manufacture rep. visit the class Visit a job-site The student will learn how to interact and work cooperatively as a team member while installing shingles and roof finish work.

Notes:

Indicator # RC 11 Understand the importance of, and properly install, thermal and moisture protection

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC11.1 Understand and demonstrate installation of thermal and moisture protection. Examples: • Describe the requirements for insulation • Describe the characteristics of various types of insulatimg material • Calculate the required amounts of insulation materials • Describe the requirements for moisture control and ventilation • Install selected vapor barriers • Describe the various methods of waterproofing • Describe air infiltration control requirements • Install selected building wraps	Suggested Activity: Have a moisture barrier rep. visit the class Visit a job-site The student will learn how to interact and work cooperatively as a team member as they install moisture and thermal protection NCCER Drywall Level one Thermal & moisture Protections Module 45103-07

Notes:

Indicator # RC 12 Perform drywall installation and finishing techniques

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC12.1 Understand and demonstrate drywall installation. Examples: • Identify the different types of gypsum wallboard (drywall) and their uses • Select the type and thickness of drywall required for specific installations • Select fasteners for drywall installation • Explain the fastener schedules for different types of drywall installations • Perform single-layer drywall installations	Suggested Activity: Have a drywall professional visit the class Visit a job-site The student will learn how to interact and work cooperatively as a team member as they hang and install drywall NCCER Drywall Level one Drywall Installation Module 45104-07
Level 2 Skill/ Concept	RC12.2 Understand and demonstrate drywall finishing. Examples: • Identify the hand tools used in drywall finishing and demonstrate the ability to use these tools • Identify the automatic tools used in drywall finishing • Identify the materials used in drywall finishing	Suggested Activity: Have a drywall professional visit the class Visit a job-site NCCER Drywall Level one Drywall Finishing Module 45105-07

Notes:

Indicator # RC 13 Understand methods and complete interior finish work

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC13.1 Understand and demonstrate interior finishing. Examples: • Identify various types of door jambs and frames and demonstrate the installation procedures for placing selected door jambs and frames in different types of interior partitions • List and identify specific items included on a typical door schedule • Demonstrate the procedure of placing and hanging a selected door • Identify the different types of standard moldings and describe their uses • Make square and miter cuts using a miter box or power miter saw • Make coped joint cuts using a coping saw • Install interior trim, including: door trim, window trim, base trim, ceiling trim	Suggested Activity: Have a millwork manufacture rep. visit the class Visit a job-site The student will learn how to interact and work cooperatively as a team member installing a door

Notes:

Indicator # RC 14 Understand the cabinet manufacturing process and install cabinets

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC14.1 Understand basic cabinet design and installation. Examples: • State the classes and sizes of typical base and wall kitchen cabinets • Recognize the common types of woods used to make cabinets • Identify cabinet components and hardware and describe their purpose • Install factory made cabinets, countertops, and backsplashes	Suggested Activity: Have a cabinet manufacture rep. visit the class Visit a job-site The student will learn how to interact and work cooperatively as a team member as they hang and install cabinets

Notes:

Indicator # RC 15 Understand and demonstrate installation of stairs.

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC15.1 Identify the various types and parts of stairs. Examples: • Identify the various types of stairs • Identify the various parts of stairs • Identify the materials used in the construction of stairs • Interpret construction drawings of stairs • Explain the methods of constructing various types of stairs • Understand the various terms and definitions relating to stairs	Suggested Activity: Visit a job-site The student will learn how to interact and work cooperatively as a team member NCCER Carpentry Level one Basic Stair Layout Module 27110-13
Level 2 Skill/ Concept	RC15.2 Using appropriate math formula calculate the number and sizes of risers and treads for a stairway. Examples: • Interpret construction drawings of stairs • Understand the various terms and definitions relating to stairs • Determine the number and sizes of risers and treads required for a stairway	Suggested Activity: Visit a job-site The student will learn how to interact and work cooperatively as a team member NCCER Carpentry Level one Basic Stair Layout Module 27110-13
Level 2 Skill/ Concept	RC15.3 Layout and cut stringers. Examples: • Interpret construction drawings of stairs • Explain the methods of constructing various types of stairs • Understand the various terms and definitions relating to stairs • Lay out and cut stringers • Determine the number and sizes of risers and treads required for a stairway	Suggested Activity: Visit a job-site The student will learn how to interact and work cooperatively as a team member NCCER Carpentry Level one Basic Stair Layout Module 27110-13

Notes:

Indicator # RC 16 Study the principles and standards of Basic Residential Electric and Plumbing applications

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC16.1 Understand and demonstrate basic residential electric and plumbing applications. Examples: • Interpret basic electric and plumbing codes • Identify basic residential wiring and plumbing symbols on construction drawings • Understand the layout of a residential dwelling to accommodate residential wiring and plumbing applications • Identify safety requirements when working around electric and plumbing applications • Construct a basic residential plumbing project • Construct a basic residential wring project	Suggested Activity: Have a subcontracting professional visit the class Visit a job-site The student will learn how to interact and work cooperatively as a team member as a plumbing or electrical contractor

Notes:

Indicator # RC 17 Student will participate in career exploration activities

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/ Concept	RC17.1 Research career opportunities in the Architecture and Construction fields. Examples: • Utilizing career exploration software research and write a report on career opportunities in the construction/manufacturing field • Utilize career exploration software to research educational requirements for a chosen career path • Utilizing career exploration software, update the students portfolio	Suggested Activity: Invite a career professional to visit and explain their duties Incorporate a Career Path in the MyLife portfolio

Notes: