WHITEWATER CAREER CENTER
CULINARY ARTS

Scope and Sequence
Curriculum Outline

Career Program: Construction Technology I
DOE Code: 5580
Career Cluster: Architecture and Construction
Recommended Grade Levels: 11, 12
Prerequisites: None
High School Credits: 3 per semester (6 total per school year)
Additional Information: Counts as a Directed Elective or Elective for the General, Core 40, Academic Honors and Technical Honors diplomas

Program Description: Construction Technology I focuses on classroom and lab experiences involving the formation, installation, maintenance, and repair of buildings, homes, and other structures. A history of construction, with an emphasis on future trends and career options, is also covered. This program provides instruction in reading technical drawings and transforming those drawings into physical structures. The relationship of views and details, interpretation of dimension, transposing scale, tolerance, electrical symbols, sections, materials list, architectural plans, geometric construction, three dimensional drawing techniques, and sketching are presented as well as elementary aspects of residential design and site work. Students examine the design and construction of floor and wall systems and develop layout and floor construction skills. Blueprints and other professional planning documents are also covered. Students will develop an understanding and interpretation of the Indiana Residential Code for one and two-family dwellings and safety practices including OSHA's safety & health standards for the construction industry.

Alignment: Indiana Department of Education Academic Standards Course Framework; National Center for Construction Education and Research (NCCER) Core Curriculum; NCCER Carpentry I Curriculum; Ivy Tech Community College (dual credit agreement); NCCER textbook materials

Companion Documents: WCC Construction Technology I Program Syllabus; WCC High School Pathway Plan; WCC Program Description Guide

Curriculum Content Summary:

- Safety
- Tools
- Plans, Specifications, and Codes
- Construction Blueprint Reading
- Floor and Wall Construction
- Building Materials, Fasteners, and Adhesives
- Basic Employability / Orientation to the Construction Trade

Content	Indiana DOE Standards	Knowledge & Skills *(Based on NCCER)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Safety **Core Standard I** Students integrate basic shop and workplace safety concepts into classroom activities and projects	**CTI-1.1** Demonstrate safe practices and procedures with power and hand tools **CTI-1.2** Demonstrate an understanding of basic shop and workplace safety in compliance with OSHA standards **CTI-1.3** Perform basic first aid procedures **CTI-1.4** Interpret health, safety, and welfare standards as dictated by local, state, or federal agencies, in relation to shop/work site safety	**NCCER Core – Module 1** • Describe the importance of safety, the causes of workplace incidents, and the process of hazard recognition and control • Describe the safe work requirements for elevated work, including fall protection guidelines • Identify and explain how to avoid stuck-by and caught-in-between hazards • Identify common energy-related hazards and explain how to avoid them • Identify and describe the proper use of personal protective equipment • Identify and describe other specific job-site safety hazards • Properly set up and climb/descend and extension ladder, demonstrating proper three-point contact • Inspect PPE items and determine if they are safe to use • Properly don, fit, and remove PPE items • Inspect a typical power cord and GFCI to ensure their serviceability **NCCER Core – Module 6** • Identify and describe various types of rigging slings, hardware, and equipment • Demonstrate the proper ASME Emergency Stop hand signal **NCCER Core – Module 9** • Describe the basic concepts of material handling and common safety precautions • Identify various types of material handling equipment and describe how they are used • Demonstrate safe manual lifting techniques • Demonstrate how to tie common knots	**Projects** • All safety rules are followed during the implementation of all class projects, including proper PPE • Proper lifting and material moving techniques and teamwork are practiced • The use of ladders, scaffolding and fall protection devices is practiced **Classroom** • Safety Videos • OSHA 10 course • Real project safety discussions • Actual field examples of common mistakes and safety violations • Communication exercise	4 weeks Reinforced throughout the year	• NCCER Core Curriculum Modules 1, 6, and 9 Written and Performance Assessments • NCCER Construction Site Safety Orientation Credential • OSHA 10-Hour Certification • Project/lab participation • Dual credit • Classroom work

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DOMAIN Tools **Core Standard 2** Students utilize the appropriate hand, power, and stationary tools to complete various components of a building project.	**CTI-2.1** Use basic construction hand tools **CTI-2.2** Demonstrate the proper use of portable power tools **CTI-2.3** Demonstrate the proper set-up and use of stationary power tools **CTI-2.**4 Set up and properly use levels and transits	**NCCER Core – Module 3** • Identify and explain how to use various types of hand tools • Identify and explain how to use various types of measurement and layout tools • Identify and explain how to use various types of cutting and shaping tools • Identify and explain how to use other common hand tools • Visually inspect hand tools to determine if they are safe to use • Safely and properly use hand tools • Make a straight, square cut in framing lumber using a crosscut saw **NCCER Core – Module 4** • Identify and explain how to use various types of power drills and impact wrenches • Identify and explain how to use various types of power saws • Identify and explain how to use various grinders and grinder attachments • Identify and explain how to use miscellaneous power tools • Safely and properly demonstrate the use of power tools	• Lab activities requiring various hand tools and power tools • Class projects requiring various hand tools and power tools	3 weeks Reinforced throughout the year	• NCCER Core Curriculum Modules 3 and 4 Written and Performance Assessments • Project/lab participation • Dual credit • Classroom work

Content	Indiana DOE Standards	Knowledge & Skills *(Based on NCCER)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Plans, Specifications, and Codes **Core Standard 3** Students interpret data from plans, specifications and codes to construct various structures	**CTI-3.1** Interpret plans, specifications, codes, and welfare standards as dictated by local, state, or federal agencies **CTI-3.2** Apply the use of construction tools in the creation of a lab project built to plans or specifications **CTI-3.3** Identify the types of architectural lines, symbols, notations, and abbreviations used in print reading **CTI-3.4** Evaluate technical problems and information in relation to appropriate project levels	**NCCER Carpentry Level 1 – Module 4** • Describe the types of drawings usually included in a set of plans and describe the information found on each type • State the purpose of written specifications • Identify the methods of squaring a building • Read and interpret foundation, floor, and other plan view drawings • Read and interpret elevation view drawings • Read and interpret section and detail drawings • Read and interpret schedules • Read and interpret written specifications • Establish 90-degree angles using the 3-4-5 rule	• Plan analysis • Lab and class projects built from plans • Drafting projects • Blueprint study on iPads • Layout projects • Study specifications and scopes of projects before starting	4 weeks Reinforced throughout the year	• NCCER Carpentry Level 1 Module 4 Written and Performance Assessments • Project/lab participation • Dual credit • Classroom work

Content	Indiana DOE Standards	Knowledge & Skills *(Based on NCCER)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Construction Blueprint Reading **Core Standard 4** Students interpret residential and light commercial construction blueprints to construct structures.	**CTI-4.1** Interpret health, safety, and welfare standards as dictated by local, state, or federal agencies **CTI-4.2** Identify the types of architectural lines, symbols, notations, and abbreviations used in print reading **CTI-4.3** Identify types of drawings such as elevation views, section views, detail views, and construction materials **CTI-4.4** Verify the ability to understand and explain building specifications, define dimensioning standards, and the ability to read various scales used in print reading **CTI-4.5** Apply and adapt knowledge and skills in reading blueprints for structural information **CTI-4.6** Apply and adapt the knowledge and skills in reading various plot plans, and reading blueprints for various trade information **CTI-4.7** Apply and adapt systems concepts and knowledge to residential and light commercial technologies	**NCCER Core – Module 5** • Identify various types of construction drawings • Identify and describe the purpose of the five basic construction drawing components • Identify and explain the significance of various drawing elements, such as lines of construction, symbols, and grid lines • Identify and explain the use of dimensions and various drawing scales • Identify and describe how to use engineer's and architect's scales • Using a floor plan, locate elements of the structure, including walls, dimensions, and elevation **NCCER Carpentry Level 2 – Module 1** • Identify the types and uses of commercial construction drawings and schedules • Define the use of specifications and how they are referenced • Locate items contained in a set of commercial drawings • Examine a drawing to cross-reference the accuracy of dimensions from architectural to structural drawings • Identify various criteria necessary for interpretation • Interpret key aspects of a drawing	• Blueprint study on iPads • Layout projects • Plan analysis • Lab and class projects built from plans • Drafting projects • Blueprint study on iPads • Layout projects • Study specifications and scopes of projects before starting	6 weeks Reinforced throughout the year	• NCCER Core Curriculum Module 5 Written and Performance Assessments • NCCER Carpentry Level 2 Module 1 Written and Performance Assessments • Project/lab participation • Dual credit • Classroom work

Content	Indiana DOE Standards	Knowledge & Skills *(Based on NCCER)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Floor and Wall Construction **Core Standard 5** Students evaluate quantities and strength of concrete and masonry materials to perform floor and wall installations	**CTI-5.1** Create openings for access and equipment to pass through in foundation walls and basement walls **CTI-5.2** Choose the proper tools for pouring and finishing concrete flatwork **CTI-5.3** Establish proper foundation corners for a structure based on blueprints and use those corners to install walls	• Exposure to concrete floor and wall installations	• Concrete Lab projects • Masonry Lab projects	1 week Reinforced throughout the year	• Project/lab participation • Classroom work

Content	Indiana DOE Standards	Knowledge & Skills *(Based on NCCER)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Floor and Wall Construction (continued) **Core Standard 6** Students construct floor framing as dictated by local, state, or federal regulation	**CTI-6.1** Select the proper tools and material for layout in construction of a floor system **CTI-6.2** Apply and adapt methods used in laying out floor framing systems **CTI-6.3** Apply and adapt knowledge of floor framing systems by listing all required components and describing their functions **CTI-6.4** Describe the sub-assemblies, which make up the floor layout **CTI-6.5** Create a floor system in accordance with proper construction procedures and practices	**NCCER Carpentry Level 1 – Module 5** • Read and interpret specifications and drawings to determine floor system requirements • Identify the different types of framing systems • Identify floor system components • Describe the construction methods for floor systems, and identify floor system materials • Estimate the amount of material needed for a floor assembly • Identify some common alternative floor systems • Lay out and construct a floor assembly, including a rough opening and subfloor material • Estimate the amount of material to frame a floor assembly from a set of plans	• Shop projects including dog houses, sheds, and playhouses • Site projects including sheds, decks, houses and other buildings	4 weeks Reinforced throughout the year	• NCCER Carpentry Level 1 Module 5 Written and Performance Assessments • Project/lab participation • Dual credit • Classroom work

Content	Indiana DOE Standards	Knowledge & Skills *(Based on NCCER)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Floor and Wall Construction (continued) **Core Standard 7** Students construct wall framing as dictated by local, state, or federal regulation	**CTI-7.1** Select the proper tools and material for layout in construction of a wall system **CTI-7.2** Apply and adapt methods used in laying out wall framing systems **CTI-7.3** Apply and adapt knowledge of wall framing systems by listing all required components and describing their functions **CTI-7.4** Describe the sub-assemblies, which make up the wall layout **CTI-7.5** Create a wall system in accordance with proper construction procedures and practices	**NCCER Carpentry Level 1 – Module 6** • Identify the components of a wall system • Describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and fire-stops • Describe the correct procedure to assemble, erect, and brace exterior walls for a frame building • Describe wall framing techniques used in masonry construction • Describe the correct procedure to estimate the materials required to frame walls • Identify alternative wall systems • Lay out a wood frame wall, including plates, corner posts, door and window opening, partition Ts, bracing, and fire-stops • Assemble and erect a wood frame wall, including plates, corner posts, door and window opening, partition Ts, bracing, and fire-stops • Correctly install sheathing on a wall • Estimate the materials required to frame walls **NCCER Carpentry Level 2 – Module 2** • Identify the tools and components of cold-formed steel framing systems and their safe use • Identify the steps to lay out and install a steel stud wall • Identify other steel framing applications • Estimate the amount of materials to complete an instructor-specified steel framing project • Lay out a steel stud wall with openings to include bracing and blocking • Demonstrate the ability to build headers	• Shop projects including dog houses, sheds, and playhouses • Site projects including sheds, decks, houses and other buildings	4 weeks Reinforced throughout the year	• NCCER Carpentry Level 1 Module 6 Written and Performance Assessments • NCCER Carpentry Level 2 Module 2 Written and Performance Assessments • Project/lab participation • Dual credit • Classroom work

Content	Indiana DOE Standards	Knowledge & Skills *(Based on NCCER)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Floor and Wall Construction (continued) **Core Standard 8** Students apply concepts and basic skills in practical residential construction projects to layout a stairway	CTI-8.1 Design and layout a stairway using the framing square and match applicable to stair construction CTI-8.2 Practice safety habits- as required by the trade and OSHA- at all times CTI-8.3 Apply and adapt new building technology skills and knowledge in the workplace in reasoning, reading, writing, and mathematics with knowledge in construction principle's and concepts CTI-8.4 Apply and adapt knowledge of building structure, materials, and methods of construction. Read blueprints, interpret drawings, understand specifications, and work within tolerance CTI-8.5 Find, read and interpret technical manuals, specifications, prints, diagrams, charts, codes, architectural data, and architectural drawings CTI-8.6 Interpret health, safety, and welfare standards as dictated by local, state, or federal agencies	**NCCER Carpentry Level 1 – Module 9** • Identify the types of stairways • Identify the various components associated with stairs • Identify terms associated with stair framing • Describe the procedure used to determine the total rise, number and size of risers, and number and size of treads required for a stairway • Describe the procedure to lay out and cut stringers, risers, and treads • Calculate the total rise, number and size of risers, and number and size of treads required for a stairway • Lay out and cut a stringer **NCCER Core – Module 2** • Identify whole numbers and demonstrate how to work with them mathematically • Explain how to work with fractions • Describe the decimal system and explain how to work with decimals • Identify various tools used to measure length and show how they are used • Identify and convert units of length, weight, volume, and temperature between the imperial and metric systems of measurement • Identity basic angles and geometric shapes and explain how to calculate their area and volume	• Shop projects including dog houses, sheds, and playhouses • Site projects including sheds, decks, houses and other buildings • Shop stair layout projects • Math workbook and exercises	4 weeks Reinforced throughout the year	• NCCER Carpentry Level 1 Module 9 Written and Performance Assessments • NCCER Core Curriculum Module 2 Written and Performance Assessments • Project/lab participation • Dual credit • Classroom work

Content	Indiana DOE Standards	Knowledge & Skills *(Based on NCCER)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Floor and Wall Construction (continued) **Core Standard 9** Students establish communication skills to properly identify ideas and concepts in floor and wall layout construction	**CTI-9.1** Communicate verbally with others clearly, concisely, and convincingly	**NCCER Core – Module 7** • Describe the communication, listening, and speaking processes and their relationship to job performance • Describe good reading and writing skills and their relationship to job performance • Perform a given task after listening to oral instructions • Fill out a work-related form • Read and interpret a set of instructions for properly performing a task, and orally instruct another person to perform the task	• Work in groups on projects with a leader or foreman that rotates periodically, each student getting a turn to lead a crew	1 week Reinforced throughout the year	• NCCER Core Curriculum Module 7 Written and Performance Assessments • Project/lab participation • Dual credit • Classroom work

Content	Indiana DOE Standards	Knowledge & Skills *(Based on NCCER)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Building Materials, Fasteners, and Adhesives Students understand the various materials, fasteners, and adhesives used in the construction industry	No corresponding standards	**NCCER Carpentry Level 1 – Module 2** • Identify various types of building materials and describe their uses • List safety precautions associated with building materials • Describe the proper method of handling and storing building materials • Explain how to calculate the quantities of lumber, panel, and concrete products using industry-standard methods • Describe the fasteners, anchors, and adhesives used in construction and explain their uses • Identify a particular material and state its use • Calculate the quantities of lumber, panel, and concrete products using industry-standard methods • Demonstrate safe and proper installation of drop-in anchors	• Shop projects including dog houses, sheds, and playhouses • Site projects including sheds, decks, houses and other buildings • Participate in planning and estimating projects or potential projects	4 weeks Reinforced throughout the year	• NCCER Carpentry Level 1 Module 2 Written and Performance Assessments • Project/lab participation • Dual credit • Classroom work

Content	Indiana DOE Standards	Knowledge & Skills *(Based on NCCER)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Basic Employability / Orientation to the Construction Trade Students apply employability skills and understand the construction trade in order to gain employment	No corresponding standards	**NCCER Core – Module 8** • Describe the opportunities in the construction business and how to enter the construction workforce • Explain the importance of critical thinking and how to solve problems • Explain the importance of social skills and identify ways good social skills are applied in the construction trade **NCCER Carpentry Level 1 – Module 1** • Identify the career and entrepreneurial opportunities within the carpentry trade • Identify the skills, responsibilities, and characteristics need to be a successful carpenter • Summarize how to be connected to the industry through an organization like SkillsUSA • Explain the importance of safety in the construction industry, and describe the obligations of the contractor, subcontractors, and individual to ensure a safe work environment	• Guest speakers from the military, union, and potential employers • Provide opportunities for some students through work based learning • SkillsUSA membership • Skills competitions • NTHS • Student ambassadors • Field trips	1 week Reinforced throughout the year	• NCCER Core Curriculum Module 8 Written and Performance Assessments • NCCER Carpentry Level 1 Module 1 Written and Performance Assessments • Project/lab participation • Essential Skills Evaluation • Technical Skills Evaluation • Work Ethic Certification