



Advanced Construction Technology

Course Description

This course is designed for the student pursuing a career as a construction professional. Technical skills are combined with planning and management topics to prepare the student for all stages of a project. This course explores opportunities and career pathways within the residential, commercial, and industrial sectors, and walks the student through the planning, execution, and reporting of a project. Students will master project setup (estimating, scheduling and planning), safety awareness, applying construction materials and techniques, and developing their own professional career goals.

Course Code: 100120

Program(s) of Study to which This Course Applies

- Architecture and Construction Cluster: Construction

Teacher Certification Note: To deliver OSHA or NCCER credentials for students, teachers need additional certification.

Course Framework (Capstone)	Reference Standards	Academic Crosswalk
<p>Standard 1. Students will assess and control the types and sources of workplace hazards to ensure a safe workplace and jobsite.</p>	<p>KS (ACC06.01-06.03) NCCER 00101-09, 75501-04 OSHA 1926 WayneStateITE202-01</p>	<p>[TBD by NDE]</p>
<p>Benchmark 1.1 Demonstrate methods to correct common design and construction hazards.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Identify and describe common hazards in the workplace. • Identify and describe major sources of information about hazards in the workplace (e.g., Material Safety Data Sheets (MSDS), work procedures, exposure control plans, training materials, labels, and signage). • Identify sources of combustible/flammable materials, fire and emergencies to establish a fire safe environment. 	<p>All Standard 1 benchmarks: KS (ACC06) OSHA 1926 NCCER 00101-09, 00103-09, 00104-09, 75501-04</p>	<p>[TBD by NDE]</p>

<ul style="list-style-type: none"> • Interpret safety signs and symbols. • Identify methods for disposing of hazardous materials. 		
<p>Benchmark 1.2 Identify types and sources of workplace hazards common to design and construction situations.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Complete requirements for OSHA 10-hour and/or OSHA 30-hour. 		
<p>Benchmark 1.3 Demonstrate personal and group health and safety practices.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Demonstrate principles of safe physical movement to avoid slips, trips, and spills. • Inspect and use personal protective equipment (PPE). 		
<p>Benchmark 1.4 Demonstrate safe operation of tools and equipment.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Achieve 100% on all written safety exams. • Identify and describe how to correct electrical hazards within a work site. • Demonstrate proper grounding of power tools. • Demonstrate proper placement and storing of tools when not in use. • Inspect, maintain, adjust, lubricate hand and power tools as appropriate. • Perform equipment pre-operation checklists. • Operate a power tool safely and according to manufacturer specifications. 	<p>Wayne State ITE202-1 NCCER 00103-09-00104-09</p>	
<p>Standard 2. Students will use and apply common construction math concepts and problem solving for estimating and setup for materials on a job site.</p>	<p>KS (EDC12.1) ACC01.01 ACC03.01.03 WayneState ITE202-01 NCCER Core and MT</p>	<p>[TBD by NDE]</p>
<p>Benchmark 2.1 Estimate resources materials required for a specific project or problem.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Perform Material Takeoff (MTO) from a set of plans. • Estimate cubic yardage of concrete required for a project. • Create a budget. 	<p>ACC03.01.03 NCCER MT206-01, 27104-06</p>	
<p>Benchmark 2.2 Perform site layout, distance measurements, and proper elevation of a given project.</p>	<p>KS (ACC 10.01) NCCER 00105-09, 27104-06, 78101-04</p>	<p>[TBD by NDE]</p>



<p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> Lay out a specific project site. Shoot elevations according to project specifications. 	<p>thru 78104-04</p>	
<p>Benchmark 2.3 Apply measurement skills to accurately lay out and construct materials according to specifications.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> Calculate areas and volumes of structures. Estimate materials and supplies as needed according to calculations. Calculate rise and run of a specific roof pitch. Calculate stairs according to specifications. 	<p>KS (ACC1.01.02) KS (ACC1.01.05) NCCER 00102-09</p>	
<p>Benchmark 2.4 Use available resources/materials effectively while completing a project or resolving a problem with a project plan.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> Evaluate waste of resources/materials. Evaluate necessity for additional resources/materials. Incorporate waste reduction in pre-planning for construction on a project. Accurately measure and cut materials to reduce waste. 	<p>KS (ACC03.01.04) NCCER 00102-09 NCCER MT208-01</p>	
<p>Standard 3. Students will understand and demonstrate proficiency in construction communications.</p>	<p>KS (ACC 10.01) KS (ACC 03.02.04) KS (ACC05.01) NCCER MT201-208</p>	<p>[TBD by NDE]</p>
<p>Benchmark 3.1 Interpret and apply construction drawings accurately.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> Perform material takeoff (MTO) from drawing specifications. Determine locations of subcomponents. Interpret schedules (examples: windows, doors, fixtures). 	<p>KS (ACC10.01.01) NCCER 00105-09 NCCER 27104-06 NCCER (craft-specific)</p>	
<p>Benchmark 3.2 Demonstrate understanding of codes and permitting processes.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> Complete requirements for building permit(s). Schedule appropriate building inspections. Use information given in regulations and building codes correctly. Compare/contrast differences among residential, commercial and industrial sector requirements. 	<p>KS (ACC 05.01.01) KS (ACC 08.02.01) NCCER (craft-specific)</p>	



<p>Benchmark 3.3 Plan, organize, schedule and manage a project to optimize workflow and outcome.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Develop a flowchart of project schedule. • Schedule materials in proper sequence. 	<p>KS (ACC 03.01.01) KS (ACC03.01.02) NCCER MT207-01</p>	<p>[TBD by NDE]</p>
<p>Benchmark 3.4 Interpret, evaluate and adjust design and construction project plans and schedules to respond to unexpected events and conditions.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Modify existing plans, budgets, and/or schedules in response to unexpected changes. • Identify alternative solutions for project. • Generate project updates/change order reports. 	<p>KS (ACC 03.02) KS (ACC 03.02.02) ACC 03.02.04 NCCER MT205-01 thru 208-01</p>	
<p>Standard 4. Students will explore information on selected careers and entrepreneurial opportunities and develop professional goals.</p>	<p>KS (EDC12.1) KS (ACC09.02) KS (ACC 09.02.01) NCCER 00107-09, 00108-09,</p>	<p>[TBD by NDE]</p>
<p>Benchmark 4.1 Research a construction career pathway and identify responsibilities and characteristics of professionals in that pathway.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Practice the responsibilities and characteristics of a professional craftsperson. • Present career information and research results. • Interview/host a construction entrepreneur and identify characteristics and factors to their success. 	<p>KS (ACC09.02) KS (ACC09.02.01) NCCER 00107-09, 00108-09</p>	<p>[TBD by NDE]</p>
<p>Benchmark 4.2 Research future opportunities and employability trends in various construction sectors (residential, commercial, industrial, energy, green technologies, etc.).</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Report on information gathered from workforce development sources and various governmental agency data (DOLs, DOEs, Bureau of Labor Statistics, etc. • Report on a local LEED-certified building or similar energy-efficient construction site. • Perform a research project/analysis using current trade publication sources. 		
	<p>KS (ACC 10.02) WayneSatelTE202-01</p>	<p>[TBD by NDE]</p>



<p>Standard 5. Students will identify and understand different properties of construction materials and apply current construction techniques.</p>	<p>NCCER (modules below)</p>	
<p>Benchmark 5.1 Select the tools, machinery, and construction materials that match the requirements of the job.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Operate tools, machinery, and equipment in a safe manner. • Safely use tools, machines, and equipment productively and efficiently in alignment with industry standards. • Install proper materials according to project and manufacturer specifications. • Construct rough framing. • Complete exterior finish. • Complete interior finish. 	<p>KS (ACC 10.02.01) KS (ACC 10.02.03) NCCER craft-specific NCCER Carp. L1, L2</p>	<p>[TBD by NDE]</p>
<p>Benchmark 5.2 Identify and demonstrate the applicability of innovative equipment, materials, and building methods in a project.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Given a project, identify alternative/innovative methods, materials and equipment. • Select and install materials according to current technologies. 		
<p>Benchmark 5.3 Utilize sources of information concerning current equipment, materials, and technologies.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Research current periodicals/industry publications/manufacturer’s catalogs and present reports on sample materials. • Utilize innovative equipment, materials and technologies. • Report on products and techniques that are energy efficient, “green”, and sustainable. 	<p>KS (ACC 10.02.02) NCCER Craft specific</p>	
<p>Benchmark 5.4 Utilize and apply green/sustainable techniques in project.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Install insulation at or above recommended levels. • Report on energy efficiency of own homes. • Perform “energy audit” of a home. 	<p>NCCER 70101-09, 70201-10, 03204-07, 0304-09, 03409-09,</p>	



Reference Standards Sources

- KS = Career Clusters Knowledge and Skills Statements. Revised 2008. National Career and Technical Education Foundation, Silver Spring, MD. www.careerclusters.org.
- NCCER = National Center for Construction Education and Research
- Wayne State = Introduction to construction course at Wayne State College
- OSHA = Occupational Safety and Health Administration

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Approval date:

Revision date *(if changes made after final draft):*

Other Information

Suggestions for innovative teaching and learning strategies:	•
Related assessments:	•
Extended learning opportunities:	• SkillsUSA Teamworks competition