
2023 - 2024

PROGRAM GUIDE FOR:

ARCHITECTURE AND CONSTRUCTION CLUSTER



ALABAMA STATE DEPARTMENT OF EDUCATION
CAREER AND TECHNICAL EDUCATION
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Architecture and Construction Cluster Program Guides

In the Architecture and Construction cluster, course work leads to careers in construction technology, electrical technology, heating, ventilation, air-conditioning, (HVAC), masonry, plumbing, technical design, utility line work and welding. Course content includes significant technical depth and incorporates engineering concepts and terminology. The Architecture and Construction cluster provides students with basic knowledge and skills within a safe and appropriate setting for student exploration and achievement. The active, structured, and stimulating environment simulates the workplace setting and enhances student ability to adapt to an ever-changing job market.

****Courses highlighted in yellow are shared with other clusters. See "Shared Courses" table on page 5 for additional details.**

Career Pathway Program	Construction Technology Program (Must teach three courses from this program list within two years)		
	Courses in the construction technology program will ground the trainee in the basic knowledge and principles of carpentry, cabinetmaking masonry, concrete finishing, electrical work, HVAC, and plumbing. He or she will become skilled in different phases of a project from start to finish. Once completing this course, the student will be able to interpret construction drawings; perform quality concrete and brickwork; frame walls, ceilings, and floors of a structure; and install the proper wiring and piping for electrical, and plumbing systems. Emphasis is placed on job safety, use of hand tools and stationary power tools, materials and hardware, various types of joinery, and component assembly and installation. This program covers content such as Building Materials, Cabinet Fabrication, and Advanced Wall Systems. This program aligns with NCCER standards.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	In Demand Occupations
17002G1002	Architecture and Construction Foundations-Required Foundation Course	<ul style="list-style-type: none"> • Alabama Certified Employee (ACE) • Asphalt Roller – Skills for Success • Bulldozer – Skills for Success • Construction and Skilled Trade Assessment (CAST) • Home Builders Association of Alabama Residential Construction Skills Certification • NCCER Cabinetmaking Level 1 • NCCER Carpentry Level 1 • NCCER Construction Technology Level 1 • NCCER Core (module 6 is an elective and not required for CRI) • OSHA 30 • Skid Steer – Skills for Success 	<ul style="list-style-type: none"> • Cabinet Maker • Commercial Carpenter • Construction and Building Inspector • Construction Equipment operator • Contractor • General Contractor • Homebuilder • Industrial Carpenter • Residential Carpenter • Site Foreman
17007G1002	Cabinetmaking Finishing		
17007G1001	Cabinetmaking Joinery		
17047G1001	Career Pathway Project-Architecture & Construction		
17013G1001	Carpentry: Commercial Framing and Layout		
17002G1003	Construction Building Systems		
17011G1001	Construction Finishing		
17002G1011	Construction Foundation Layout		
17017G1000	CTE Lab in Architecture & Construction		
17013G1002	Industrial Carpentry		
17013G1003	Industrial Site Layout, Formwork, and Concrete		
12002G1003	Project Management		
17002G1010	Residential Building		
17049G1000	Safety and Health Regulations		
17006G1001	Wood Technology: 2D Design		
17006G1002	Wood Technology: 3D Design		

Career Pathway Program	Electrical Program (Must teach three courses from this program list within two years)		
	Electricians install electrical systems in structures; they install wiring and other electrical components, such as circuit breaker panels, switches, and light fixtures, and they follow blueprints, the <i>National Electrical Code</i> ® and state and local codes. To prepare trainees for a career in the electrical field, this program utilizes NCCER's comprehensive, 4-level Electrical curriculum that complies with DOL time-based standards for apprenticeship.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	In Demand Occupations
17002G1002	Architecture and Construction Foundations-Required Foundation Course	<ul style="list-style-type: none"> • Alabama Certified Employee (ACE) • Asphalt Roller – Skills for Success • Bulldozer – Skills for Success • Construction and Skilled Trade Assessment (CAST) • NCCER Core (module 6 is an elective and not require for CRI) • NCCER Electrical Level 1 • OSHA 30 • Skid Steer – Skills for Success 	<ul style="list-style-type: none"> • Industrial Electrician • Industrial Maintenance E&I Technician • Residential Electrician
17047G1001	Career Pathway Project-Architecture & Construction		
17017G1000	CTE Lab in Architecture & Construction		
17102G1000	Electrical Fundamentals		
17103G1001	Electrical Installation		
17102G1001	Electrical Technology		
17104G1010	Motor Controls		
12002G1003	Project Management		
17049G1000	Safety and Health Regulations		

Career Pathway Program	Heating, Ventilation, and Air Conditioning Program (Must teach three courses from this program list within two years)		
	The increasing development of HVAC (heating and air-conditioning systems) technology causes employers to recognize the importance of continuous education and keeping up to speed with the latest equipment and skills. This program aligns with NCCER's standards that have been designed by highly qualified subject matter experts with this in mind. This curriculum is recognized by North American Technician Excellence (NATE) and presents theoretical and practical skills essential to your success as an HVAC installer or technician.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	In Demand Occupations
17002G1002	Architecture and Construction Foundations-Required Foundation Course	<ul style="list-style-type: none"> • Air Conditioning Heating and Refrigeration Institute (AHRI) ICE - Residential Core • Asphalt Roller – Skills for Success • Alabama Certified Employee (ACE) • Bulldozer – Skills for Success • Construction and Skilled Trade Assessment (CAST) • EPA Card • NCCER Core (module 6 is an elective and not required for CRI) • NCCER HVAC Level 1 • OSHA 30 • Skid Steer – Skills for Success 	<ul style="list-style-type: none"> • HVACR Installer • HVACR Service Technician
17047G1001	Career Pathway Project-Architecture & Construction		
17017G1000	CTE Lab in Architecture & Construction		
17056G1001	HVAC Fundamentals		
17055G1001	HVAC Installation and Operation		
17052G1001	HVAC Refrigeration Systems		
12002G1003	Project Management		
17049G1000	Safety and Health Regulations		

Career Pathway Program	Masonry Program (Must teach three courses from this program list within two years)		
	The study of masonry is one of the world's oldest and most respected crafts. Masonry construction existed for thousands of years. This program encompasses modules such as Mortar, Metalwork in Masonry, and Estimating; and aligns with NCCER standards.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	In Demand Occupations
17002G1002	Architecture and Construction Foundations-Required Foundation Course	<ul style="list-style-type: none"> • Alabama Certified Employee (ACE) • Asphalt Roller – Skills for Success • Bulldozer – Skills for Success • Construction and Skilled Trade Assessment (CAST) • NCCER Core (module 6 is an elective and not required for CRI) • NCCER Masonry Level 1 • OSHA 30 • Skid Steer – Skills for Success 	<ul style="list-style-type: none"> • Brick Layer • Concrete Engraver • Site Foreman • Tile Layer
17047G1001	Career Pathway Project-Architecture & Construction		
17017G1000	CTE Lab in Architecture & Construction		
17008G1002	Masonry Laying Techniques		
17008G1001	Masonry: Mortar, Materials, and Installation		
17008G1003	Masonry: Residential		
12002G1003	Project Management		
17049G1000	Safety and Health Regulations		

Career Pathway Program	Plumbing Program (Must teach three courses from this program list within two years)		
	Most people are familiar with plumbers who come to their home to unclog a drain or install an appliance. In addition to these activities, however, plumbers install, maintain, and repair many different types of pipe systems. For example, some systems move water to a municipal water treatment plant and then to residential, commercial, and public buildings. Other systems dispose of waste, provide gas to stoves and furnaces, or supply air conditioning. Pipe systems in power plants carry the steam that powers huge turbines. Pipes also are used in manufacturing plants, such as wineries, to move material through production processes. This program aligns with NCCER's four-level curriculum that covers topics such as Plumbing Tools, Types of Valves, and Potable Water Treatment.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	In Demand Occupations
17002G1002	Architecture and Construction Foundations-Required Foundation Course	<ul style="list-style-type: none"> • Alabama Certified Employee (ACE) • Asphalt Roller – Skills for Success • Bulldozer – Skills for Success • Construction and Skilled Trade Assessment (CAST) • NCCER Core (module 6 is an elective and not required for CRI) • NCCER Pipefitting Level 1 • NCCER Plumbing Level 1 • OSHA 30 • Skid Steer – Skills for Success 	<ul style="list-style-type: none"> • Industrial Maintenance Mechanic • Pipefitter • Plumber
17047G1001	Career Pathway Project-Architecture & Construction		
17017G1000	CTE Lab in Architecture & Construction		
17058G1001	Plumbing and Pipefitting		
17058G1002	Plumbing Systems		
12002G1003	Project Management		
17049G1000	Safety and Health Regulations		

Career Pathway Program	Technical Design Program (Must teach three courses from this program list within two years)		
	Courses in the drafting program are designed to enable students to pursue a successful career in an architectural, engineering, or industrial field. Students learn technical, mechanical drafting, and computer-aided drafting.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	In Demand Occupations
21106G1001	Technical Design Communications I- Required Foundation Course	<ul style="list-style-type: none"> Alabama Certified Employee (ACE) Asphalt Roller – Skills for Success Autodesk- AutoCAD Certified User Autodesk Fusion 360 Certified User Autodesk- Inventor Certified User Autodesk- Revit Certified User Bulldozer – Skills for Success Construction and Skilled Trade Assessment (CAST) OSHA 30 Skid Steer – Skills for Success SolidEdge Certified Associate SolidWorks Associate 	<ul style="list-style-type: none"> Architect CAD Designer Industrial Designer Residential Designer
21103G1003	Architectural Building Information Modeling (BIM) I		
21103G1004	Architectural Building Information Modeling (BIM) II		
21103G1005	Architectural Design Fundamentals		
21103G1006	Architectural Structural Design		
17047G1001	Career Pathway Project-Architecture & Construction		
17017G1000	CTE Lab in Architecture & Construction		
12002G1003	Project Management		
17049G1000	Safety and Health Regulations		
21106G1002	Technical Design Communications II		

Career Pathway Program	Utility Line Worker Program (Must teach three courses from this program list within two years)		
	Utility Line Worker addresses the fundamental aspects of power line and telecommunications work to include safety, electrical theory, climbing techniques, aerial framing and rigging, and operating utility service equipment.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	In Demand Occupations
17002G1002	Architecture and Construction Foundations- Required Foundation Course	<ul style="list-style-type: none"> Alabama Certified Employee (ACE) Asphalt Roller – Skills for Success Bulldozer – Skills for Success Construction and Skilled Trade Assessment (CAST) NCCER Core (module 6 is an elective and not required for CRI) OSHA 30 Skid Steer – Skills for Success 	<ul style="list-style-type: none"> Utility Line Worker (electrical or telecommunications)
17047G1001	Career Pathway Project-Architecture & Construction		
17017G1000	CTE Lab in Architecture & Construction		
12002G1003	Project Management		
17049G1000	Safety and Health Regulations		
17104G1011	Utility Line Worker		
17104G1012	Utility Line Worker Service Equipment		

Career Pathway Program	Welding Program (Must teach three courses from this program list within two years)		
	Welding is a highly skilled industry that can take you places all over the world. From ladders to aircraft carriers, from NASCAR to national defense, and from the laboratory to sales and repair, the varied welding industry impacts virtually every industry. Technology is creating more uses for welding in the workplace. For example, new ways are being developed to bond dissimilar materials and non-metallic materials, such as plastics, composites, and new alloys. Also, advances in laser beam and electron beam welding, new fluxes, and other new technologies and techniques all point to an increasing need for highly trained and skilled workers. This program aligns with NCCER's four-level curriculum covering topics such as Oxyfuel Cutting, Welding Symbols, and Stainless-Steel Groove Welds. NCCER's curriculum also correlates to the AWS standards and guidelines for an Entry Welder.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	In Demand Occupations
17002G1002	Architecture and Construction Foundations- Required Foundation Course	<ul style="list-style-type: none"> Alabama Certified Employee (ACE) Asphalt Roller – Skills for Success AWS Certifications (one or more areas) <ul style="list-style-type: none"> - FCAW 3-G uphill progression D1.1 - GMAW 3-G uphill progression D1.1 - GTAW 3-G uphill progression (aluminum) D1.2 - GTAW 3-G uphill progression (steel) - SMAW 3-G uphill progression D1.1 Bulldozer – Skills for Success Construction and Skilled Trade Assessment (CAST) NCCER Core (module 6 is an elective and not required) NCCER Welding Level 1 OSHA 30 Skid Steer – Skills for Success 	<ul style="list-style-type: none"> Certified Welding Inspector Industrial Maintenance Mechanic Pipefitter Under Water Welder Welder Welding Supervisor
17047G1001	Career Pathway Project-Architecture & Construction		
17017G1000	CTE Lab in Architecture & Construction		
12002G1003	Project Management		
17049G1000	Safety and Health Regulations		
13207G1003	Welding: GMAW and FCAW		
13207G1001	Welding: SMAW I		
13207G1002	Welding: SMAW II		

2023 – 2024 Subject and Personnel Codes
Architecture and Construction Cluster

Architecture and Construction Cluster Program Courses	
Course Number	Course Name
17002G1002	Architecture and Construction Foundations-Required Foundation Course
21103G1003	Architectural Building Information Modeling (BIM) I
21103G1004	Architectural Building Information Modeling (BIM) II
21103G1005	Architectural Design Fundamentals
21103G1006	Architectural Structural Design
17007G1002	Cabinetmaking Finishing
17007G1001	Cabinetmaking Joinery
17047G1001	Career Pathway Project-Architecture and Construction
17013G1001	Carpentry: Commercial Framing and Layout
17002G1003	Construction Building Systems
17011G1001	Construction Finishing
17002G1011	Construction Foundations Layout
17017G1000	CTE Lab in Architecture & Construction
17102G1000	Electrical Fundamentals
17103G1001	Electrical Installation
17102G1001	Electrical Technology
17056G1001	HVAC Fundamentals
17055G1001	HVAC Installation and Operation
17052G1001	HVAC Refrigeration Systems
17013G1002	Industrial Carpentry
17013G1003	Industrial Site Layout, Formwork, and Concrete
17008G1002	Masonry Laying Techniques
17008G1001	Masonry: Mortar, Materials, and Installation
17008G1003	Masonry: Residential
17104G1010	Motor Controls
17058G1001	Plumbing and Pipefitting
17058G1002	Plumbing Systems
12002G1003	Project Management
17002G1010	Residential Building
17049G1000	Safety and Health Regulations
21106G1001	Technical Design Communications I-Required Foundation Course
21106G1002	Technical Design Communications II
17104G1011	Utility Line Worker
17104G1012	Utility Line Worker Service Equipment
13207G1003	Welding: GMAW and FCAW
13207G1001	Welding: SMAW I
13207G1002	Welding: SMAW II
17006G1001	Wood Technology: 2D Design
17006G1002	Wood Technology: 3D Design

General Note: Course descriptions and content standards for most courses are located on the Alabama Department of Education website at:
<https://www.alabamaachievers.org/career-and-technical-education/cte-courses-of-study/>.

Shared Courses			
Course Number	Course Name	Cluster(s)	Required Year to Implement COS
17049G1000	Safety and Health Regulations	Manufacturing Transportation, Distribution and Logistics	2022-2023
12002G1003	Project Management	Business and Marketing	2022-2023

College and Career Readiness Indicator Course Matrix

Program Name	Construction Technology	Technical Design Program	Electrical	Heating, Ventilation, And Air Conditioning,
Foundation Course(s)	Architecture and Construction Foundations	Technical Design Communications I	Architecture and Construction Foundations	Architecture and Construction Foundations
Concentrator Course(s)	Cabinetmaking Finishing Cabinetmaking Joinery Carpentry: Commercial Framing and Layout Construction Building Systems Construction Finishing Construction Foundations Layout Industrial Site Layout, Formwork, and Concrete Project Management Residential Building Safety and Health Regulations Wood Technology: 2D Design Wood Technology: 3D Design	Architectural Building Information Modeling (BIM) I Architectural Building Information Modeling (BIM) II Architecture Design Fundamentals Architectural Structural Design Project Management Safety and Health Regulations Technical Design Communications II	Electrical Fundamentals Electrical Installation Electrical Technology Motor Controls Project Management Safety and Health Regulations	HVAC Fundamentals HVAC Installation and Operation HVAC Refrigeration Systems Project Management Safety and Health Regulations
Capstone Course(s)	Career Pathway Project – Architecture & Construction CTE Lab in Architecture & Construction	Career Pathway Project – Architecture & Construction CTE Lab in Architecture & Construction	Career Pathway Project – Architecture & Construction CTE Lab in Architecture & Construction	Career Pathway Project – Architecture & Construction CTE Lab in Architecture & Construction

Program Name	Masonry	Plumbing	Utility Line Worker	Welding
Foundation Course(s)	Architecture and Construction Foundations	Architecture and Construction Foundations	Architecture and Construction Foundations	Architecture and Construction Foundations
Concentrator Course(s)	Masonry Laying Techniques Masonry: Mortar, Materials, and Installation Masonry: Residential Project Management Safety and Health Regulations	Plumbing and Pipefitting Plumbing Systems Project Management Safety and Health Regulations	Project Management Safety and Health Regulations Utility Line Worker Utility Line Worker Service Equipment	Project Management Safety and Health Regulations Welding: GMAW and FCAW Welding: SMAW I Welding: SMAW II
Capstone Course(s)	Career Pathway Project – Architecture & Construction CTE Lab in Architecture & Construction	Career Pathway Project – Architecture & Construction CTE Lab in Architecture & Construction	Career Pathway Project – Architecture & Construction CTE Lab in Architecture & Construction	Career Pathway Project – Architecture & Construction CTE Lab in Architecture & Construction

To meet the CCR Indicator as a CTE completer, a student must earn three (3.0) credits with the grade of a “C” or higher in CTE courses that are part of an approved CTE program of study. Additional requirements are outlined in [Memorandum FY22-2065](#).

This matrix is intended for general guidance on the CCR completer status and is subject to change. For all CTE programming information, please refer to the CTE Cluster specific Program Guide. It contains a list of approved CTE programs, valid course numbers, required prerequisite courses, approved Career Readiness Indicators (CRIs) and in demand occupations.

***Courses are listed in alphabetical order, not in sequential order.**