



2022 – 2023

PROGRAM GUIDE FOR:

ARCHITECTURE AND CONSTRUCTION CLUSTER



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

In the Architecture and Construction cluster, course work leads to careers in drafting design; welding; electrical technology; heating, ventilation, air-conditioning, and refrigeration (HVACR); carpentry; cabinetmaking; building construction, masonry, plumbing, utility line work and pipefitting. 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 6 for additional details.**

Building Construction Program			
(Must teach three courses from this program list within two years)			
Career Pathway Program	Courses in the building construction program will ground the trainee in the basic knowledge and principles of carpentry, 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. This program aligns with NCCER standards.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> • Alabama Certified Worker (Ready to Work) • Construction and Skilled Trade Assessment (CAST) • Home Builders Association of Alabama Residential Construction Skills Certification • NCCER Core (module 6 is an elective and not required for CRI) • NCCER Construction Technology Level 1 • NCCER Carpentry Level 1 	<ul style="list-style-type: none"> • Residential Carpenter • Commercial Carpenter • Industrial Carpenter • Cabinet Maker • Contractor • Site Foreman
17017G1000	CTE Lab in Architecture & Construction		
17004G1001	NCCER Building Construction 1 - Construction Framing		
17005G1001	NCCER Building Construction 2 - Site Preparation		
17005G1002	NCCER Building Construction 3 - Construction Finishing		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		
Cabinetmaking Program			
(Must teach three courses from this program list within two years)			
Career Pathway Program	Cabinetmaking courses are designed to provide students with the fundamental knowledge and skills for the cabinetmaking sector of the construction industry. 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 aligns with NCCER standards.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> • Alabama Certified Worker (Ready to Work) • Construction and Skilled Trade Assessment (CAST) • Home Builders Association of Alabama Residential Construction Skills Certification • NCCER Core (module 6 is an elective and not required for CRI) • NCCER Cabinetmaking Level 1 • NCCER Carpentry Level 1 	<ul style="list-style-type: none"> • Cabinet Maker
17007G1013	Cabinetmaking I		
17007G1023	Cabinetmaking II		
17007G1033	Cabinetmaking III		
17017G1000	CTE Lab in Architecture & Construction		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		
Carpentry Program			
(Must teach three courses from this program list within two years)			
Career Pathway Program	Carpenters make up the largest building trades occupation in the industry and those with all-around skills are in high demand. Carpenters are involved in many different kinds of construction activities, from building highways and bridges to installing kitchen cabinets. Carpenters construct, erect, install, and repair structures and fixtures made from wood and other materials. 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)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> • Alabama Certified Worker (Ready to Work) • Construction and Skilled Trade Assessment (CAST) • Home Builders Association of Alabama Residential Construction Skills Certification • NCCER Core (module 6 is an elective and not required for CRI) • NCCER Carpentry Level 1 	<ul style="list-style-type: none"> • Residential Carpenter • Commercial Carpenter • Industrial Carpenter • Cabinet Maker • Contractor • Site Foreman
17017G1000	CTE Lab in Architecture & Construction		
17006G1012	Computer Numerically Controlled (CNC) Wood Technology 1		
17006G1022	Computer Numerically Controlled (CNC) Wood Technology 2		
17002G1000	NCCER Carpentry 1		
17004G1000	NCCER Carpentry 2		
17011G1000	NCCER Carpentry 3		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		

Career Pathway Program	Drafting Design Technology 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)	Workforce Careers
21103G1033	Advanced Architectural Design	<ul style="list-style-type: none"> Alabama Certified Worker (Ready to Work) Autodesk- AutoCAD Certified User Autodesk- Inventor Certified User Autodesk Fusion 360 Certified User Autodesk- Revit Certified User Construction and Skilled Trade Assessment (CAST) SolidEdge Certified Associate SolidWorks Associate 	<ul style="list-style-type: none"> CAD Designer Architect Residential Designer Industrial Designer
21106G1033	Advanced Drafting Design		
17002G1001	Architecture, Construction, and Manufacturing		
17017G1000	CTE Lab in Architecture & Construction		
21103G1023	Intermediate Architectural Design		
21106G1023	Intermediate Drafting Design		
21106G1013	Introduction to Drafting Design		
21103G1013	Introduction to Architectural Design		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		
21104G1000	Structural Drafting		
21107G1012	Three-Dimensional Solid Model Design I		
21107G1022	Three-Dimensional Solid Model Design II		

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)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> Alabama Certified Worker (Ready to Work) Construction and Skilled Trade Assessment (CAST) NCCER Core (module 6 is an elective and not require for CRI) NCCER Electrical Level 1 	<ul style="list-style-type: none"> Residential Electrician Industrial Electrician Industrial Maintenance E&I Technician
17017G1000	CTE Lab in Architecture & Construction		
17101G1000	NCCER Electrical Technologies 1		
17103G1000	NCCER Electrical Technologies 2		
17105G1000	NCCER Electrical Technologies 3		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		

Career Pathway Program	Heating, Ventilation, Air Conditioning, and Refrigeration 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)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> Air Conditioning Heating and Refrigeration Institute (AHRI) ICE - Residential Core Alabama Certified Worker (Ready to Work) EPA Card Construction and Skilled Trade Assessment (CAST) NCCER Core (module 6 is an elective and not required for CRI) NCCER HVAC Level 1 	<ul style="list-style-type: none"> HVACR Installer HVACR Service Technician
17017G1000	CTE Lab in Architecture & Construction		
17057G1000	NCCER HVAC 1		
17051G1000	NCCER HVAC 2		
17056G1000	NCCER HVAC 3		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		

Career Pathway Program	Heavy Equipment Operation Program (Must teach three courses from this program list within two years)		
	The Energy and Power curriculum will introduce students to the many career and educational opportunities that exist in the energy and power industry. Through the four courses that form the Energy and Power pathway, students will research, design and build a series of authentic, hands-on projects that will enable them to understand the interplay of the generation, distribution and use of energy. Systems thinking is used as an approach to teach how things work by understanding how the parts influence the entire system and how the system impacts the parts. This program aligns with NCCER standards.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> Alabama Certified Worker (Ready to Work) Construction and Skilled Trade Assessment (CAST) NCCER Core (module 6 is an elective and not required for CRI) NCCER Heavy Equipment Operations Level 1 	<ul style="list-style-type: none"> Heavy Equipment Operator
17017G1000	CTE Lab in Architecture & Construction		
20052G1013	NCCER Heavy Equipment Operations 1		
20052G1023	NCCER Heavy Equipment Operations 2		
20104G1033	NCCER Heavy Equipment Operations 3		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		

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)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> Alabama Certified Worker (Ready to Work) Construction and Skilled Trade Assessment (CAST) NCCER Core (module 6 is an elective and not required for CRI) NCCER Masonry Level 1 	<ul style="list-style-type: none"> Brick Layer Concrete Engraver Tile Layer Site Foreman
17017G1000	CTE Lab in Architecture & Construction		
17008G1013	NCCER Masonry 1		
17008G1023	NCCER Masonry 2		
17008G1033	NCCER Masonry 3		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		

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)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> Alabama Certified Worker (Ready to Work) Construction and Skilled Trade Assessment (CAST) NCCER Core (module 6 is an elective and not required for CRI) NCCER Plumbing Level 1 NCCER Pipefitting Level 1 	<ul style="list-style-type: none"> Pipefitter Plumber Industrial Maintenance Mechanic
17017G1000	CTE Lab in Architecture & Construction		
17058G1013	Plumbing and Pipefitting I		
17058G1023	Plumbing and Pipefitting II		
17058G1033	Plumbing and Pipefitting III		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		

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)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> Alabama Certified Worker (Ready to Work) Construction and Skilled Trade Assessment (CAST) NCCER Core (module 6 is an elective and not required for CRI) 	<ul style="list-style-type: none"> Utility Line Worker (electrical or telecommunications)
17017G1000	CTE Lab in Architecture & Construction		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		
17104G1013	Utility Line Workers Foundation		
17104G1023	Utility Line Workers Level 1		
17104G1033	Utility Line Workers Level 2		

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)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> Alabama Certified Worker (Ready to Work) AWS Certifications (one or more areas) <ul style="list-style-type: none"> -SMAW 3-G uphill progression D1.1 -GTAW 3-G uphill progression (steel) -FCAW 3-G uphill progression D1.1 -GTAW 3-G uphill progression (aluminum) D1.2 -GMAW 3-G uphill progression D1.1 Construction and Skilled Trade Assessment (CAST) NCCER Core (module 6 is an elective and not required) NCCER Welding Level 1 	<ul style="list-style-type: none"> Welder Certified Welding Inspector Welding Supervisor Under Water Welder Pipefitter Industrial Maintenance Mechanic
17017G1000	CTE Lab in Architecture & Construction		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		
13207G1014	NCCER Welding 1		
13207G1024	NCCER Welding 2		
13207G1034	NCCER Welding 3		
13207G1044	NCCER Welding 4		

Career Pathway Program	SREB AC Clean Energy Program (Must teach three courses from this program list within two years)		
	The Clean Energy Technology program enables students to apply fundamental science and operating principles of clean energy systems to authentic problems. Such problems involve motors and generators, photovoltaic systems, water and energy conservation, wind turbines, biofuel generation, bioreactors, waterpower, energy harvesting, fuel cells and nuclear power. Students use an engineering design process to develop solutions to these authentic problems.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> Construction and Skilled Trade Assessment (CAST) NCCER Core (module 6 is an elective and not required for CRI) 	<ul style="list-style-type: none"> Engineer
18506G1014	Clean Energy Systems		
18506G1024	Clean Energy Applications		
18506G1034	Clean Energy Strategies		
18506G1044	Clean Energy Innovations		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		

Career Pathway Program	SREB AC Energy and Power Program (Must teach three courses from this program list within two years)		
	The Energy and Power curriculum will introduce students to the many career and educational opportunities that exist in the energy and power industry. Through the four courses that form the Energy and Power pathway, students will research, design and build a series of authentic, hands-on projects that will enable them to understand the interplay of the generation, distribution and use of energy. Systems thinking is used as an approach to teach how things work by understanding how the parts influence the entire system and how the system impacts the parts.		
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
17002G1001	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> Construction and Skilled Trade Assessment (CAST) NCCER Core (module 6 is an elective and not required for CRI) 	<ul style="list-style-type: none"> Engineer
20101G1013	Energy and Power Foundations SREB		
20101G1023	Energy Transmission and Distribution SREB		
20101G1033	Electronics and Control Systems SREB		
17049G1000	Safety and Health Regulations		
17047G1000	Senior Career Pathway Project-Architecture & Construction		

2022 – 2023 Subject and Personnel Codes
Architecture and Construction Cluster

Course Number	Course Name
21103G1033	Advanced Architectural Design
21106G1033	Advanced Drafting Design
17002G1001	Architecture, Construction, and Manufacturing
17007G1013	Cabinetmaking I
17007G1023	Cabinetmaking II
17007G1033	Cabinetmaking III
18506G1024	Clean Energy Applications
18506G1044	Clean Energy Innovations
18506G1034	Clean Energy Strategies
18506G1014	Clean Energy Systems
17006G1012	Computer Numerically Controlled (CNC) Wood Technology 1
17006G1022	Computer Numerically Controlled (CNC) Wood Technology 2
17017G1000	CTE Lab in Architecture & Construction
20101G1033	Electronics and Control Systems SREB
20101G1013	Energy and Power Foundations SREB
20101G1023	Energy Transmission and Distribution SREB
21103G1023	Intermediate Architectural Design
21106G1023	Intermediate Drafting Design
21103G1013	Introduction to Architectural Design
21106G1013	Introduction to Drafting Design
17004G1001	NCCER Building Construction 1 - Construction Framing
17005G1001	NCCER Building Construction 2 - Site Preparation
17005G1002	NCCER Building Construction 3 - Construction Finishing
17002G1000	NCCER Carpentry 1
17004G1000	NCCER Carpentry 2
17011G1000	NCCER Carpentry 3
17101G1000	NCCER Electrical Technologies 1
17103G1000	NCCER Electrical Technologies 2
17105G1000	NCCER Electrical Technologies 3
20052G1013	NCCER Heavy Equipment Operations 1
20052G1023	NCCER Heavy Equipment Operations 2
20104G1033	NCCER Heavy Equipment Operations 3
17057G1000	NCCER HVAC 1
17051G1000	NCCER HVAC 2
17056G1000	NCCER HVAC 3
17008G1013	NCCER Masonry 1
17008G1023	NCCER Masonry 2
17008G1033	NCCER Masonry 3
13207G1014	NCCER Welding 1
13207G1024	NCCER Welding 2
13207G1034	NCCER Welding 3
13207G1044	NCCER Welding 4
17058G1013	Plumbing and Pipefitting I
17058G1023	Plumbing and Pipefitting II
17058G1033	Plumbing and Pipefitting III
17049G1000	Safety and Health Regulations
17047G1000	Senior Career Pathway Project-Architecture & Construction
21104G1000	Structural Drafting
21107G1012	Three-Dimensional Solid Model Design I
21107G1022	Three-Dimensional Solid Model Design II
17104G1013	Utility Line Workers Foundation
17104G1023	Utility Line Workers Level 1
17104G1033	Utility Line Workers Level 2

Shared Courses			
Course Number	Course Name	Cluster(s)	Required Year to Implement COS
21106G1033	Advanced Drafting Design	Manufacturing	2022-2023
21106G1023	Intermediate Drafting Design	Manufacturing	2022-2023
21106G1013	Introduction to Drafting Design	Manufacturing	2022-2023
21107G1012	Three-Dimensional Solid Modeling I	Manufacturing	2022-2023
21107G1022	Three-Dimensional Solid Modeling II	Manufacturing	2022-2023
17049G1000	Safety and Health Regulations	Manufacturing Transportation, Distribution and Logistics	2022-2023

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/>.