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**2018 – 2019**

**PROGRAM GUIDE FOR:**

**ARCHITECTURE/CONSTRUCTION CLUSTER,**

**ARTS, A/V, COMMUNICATIONS CLUSTER,**

**MANUFACTURING CLUSTER,**

**STEM CLUSTER,**

**AND**

**TRANSPORTATION, DISTRIBUTION, & LOGISTICS CLUSTER**

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**ALABAMA STATE DEPARTMENT OF EDUCATION  
CAREER AND TECHNICAL EDUCATION**

**CHRIS KENNEDY ED.D., EDUCATION ADMINISTRATOR  
BEN SCHEIERMAN, EDUCATION SPECIALIST  
BRYAN UPTON, EDUCATION SPECIALIST  
TOLINA DAVIS, ADMINISTRATIVE ASSISTANT**

**(334) 242-9112**

## 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.

Career Pathway Program	<b>Drafting Design Technology Program</b> (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.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• AutoCAD</li> <li>• Inventor</li> <li>• Revit</li> <li>• Solid Works</li> <li>• Solid Edge</li> </ul>	<ul style="list-style-type: none"> <li>• CAD Designer</li> <li>• Architect</li> <li>• Residential Designer</li> <li>• Industrial Designer</li> </ul>
410005	Introduction to Drafting Design		
430010	Intermediate Drafting Design		
430011	Advanced Drafting Design		
430012	Structural Drafting		
430013	Introduction to Architectural Design		
430014	Intermediate Architectural Design		
430015	Advanced Architectural Design		
430016	Three-Dimensional Solid Model Design I		
430017	Three-Dimensional Solid Model Design II		
410011	Safety and Health Regulations		
432910	CTE Lab in Architecture & Construction		
430129	Senior Career Pathway Project-Architecture & Construction		

Career Pathway Program	<b>Building Construction Program</b> (Must teach three courses from this program list within two years)		
	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 utilizes curriculum through NCCER.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NCCER Core,</li> <li>• NCCER Carpentry Level I</li> <li>• NCCER Carpentry Level 2 &amp; up as recommended by Advisory Committee</li> </ul>	<ul style="list-style-type: none"> <li>• Residential Carpenter</li> <li>• Commercial Carpenter</li> <li>• Industrial Carpenter</li> <li>• Cabinet Maker</li> <li>• Contractor</li> <li>• Site Foreman</li> </ul>
412101	NCCER Building Construction 1 - Construction Framing		
412102	NCCER Building Construction 2 - Site Preparation		
412103	NCCER Building Construction 3 - Construction Finishing		
410011	Safety and Health Regulations		
432910	CTE Lab in Architecture & Construction		
430129	Senior Career Pathway Project-Architecture & Construction		

Career Pathway Program	<b>Cabinetmaking Program</b> (Must teach three courses from this program list within two years)		
	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.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NCCER Core</li> <li>• NCCER Cabinetmaking Level I</li> </ul>	<ul style="list-style-type: none"> <li>• Cabinet Maker</li> </ul>
430021	Cabinetmaking I		
430022	Cabinetmaking II		
430023	Cabinetmaking III		
410011	Safety and Health Regulations		
432910	CTE Lab in Architecture & Construction		
430129	Senior Career Pathway Project-Architecture & Construction		

Career Pathway Program	Carpentry Program (Must teach three courses from this program list within two years)		
	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. Utilizing NCCER's curriculum, this program covers content such as Building Materials, Cabinet Fabrication, and Advanced Wall Systems.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NCCER Core</li> <li>• NCCER Carpentry Level 1</li> <li>• NCCER Carpentry Level 2 &amp; up as recommended by Advisory Committee</li> </ul>	<ul style="list-style-type: none"> <li>• Residential Carpenter</li> <li>• Commercial Carpenter</li> <li>• Industrial Carpenter</li> <li>• Cabinet Maker</li> <li>• Contractor</li> <li>• Site Foreman</li> </ul>
432301	NCCER Carpentry 1		
432302	NCCER Carpentry 2		
432303	NCCER Carpentry 3		
430104	Computer Numerically Controlled (CNC) Wood Technology 1		
430105	Computer Numerically Controlled (CNC) Wood Technology 2		
410011	Safety and Health Regulations		
432910	CTE Lab in Architecture & Construction		
430129	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. Utilizing NCCER's three-level curriculum, this program encompasses modules such as Mortar, Metalwork in Masonry, and Estimating.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NCCER Core</li> <li>• NCCER Masonry Level 1</li> <li>• NCCER Masonry Level 2 &amp; up as recommended by Advisory Committee</li> </ul>	<ul style="list-style-type: none"> <li>• Brick Layer</li> <li>• Concrete Engraver</li> <li>• Tile Layer</li> <li>• Site Foreman</li> </ul>
432701	NCCER Masonry 1		
432702	NCCER Masonry 2		
432703	NCCER Masonry 3		
410011	Health and Safety Regulations		
432910	CTE Lab in Architecture & Construction		
430129	Senior Career Pathway Project-Architecture & Construction		

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.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NCCER Core</li> <li>• NCCER Electrical Level 1</li> <li>• NCCER Electrical Level 2 &amp; up as recommended by Advisory Committee</li> <li>• Construction and Skilled Test (CAST)</li> </ul>	<ul style="list-style-type: none"> <li>• Residential Electrician</li> <li>• Industrial Electrician</li> <li>• Industrial Maintenance E&amp;I Technician</li> </ul>
432501	NCCER Electrical Technologies 1		
432502	NCCER Electrical Technologies 2		
432503	NCCER Electrical Technologies 3		
410011	Safety and Health Regulations		
432910	CTE Lab in Architecture & Construction		
430129	Senior Career Pathway Project-Architecture & Construction		

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 utilizes 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.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NCCER Core</li> <li>• NCCER Welding Level 1</li> <li>• NCCER Welding Level 2 as recommended by Advisory Committee</li> </ul>	<ul style="list-style-type: none"> <li>• Welder</li> <li>• Certified Welding Inspector</li> <li>• Welding Supervisor</li> <li>• Under Water Welder</li> <li>• Pipefitter</li> <li>• Industrial Maintenance Mechanic</li> </ul>
432901	NCCER Welding 1		
432902	NCCER Welding 2		
432903	NCCER Welding 3		
432904	NCCER Welding 4		
410011	Safety and Health Regulations		
432910	CTE Lab in Architecture & Construction		
430129	Senior Career Pathway Project-Architecture & Construction		

<b>Plumbing Program</b> <b>(Must teach three courses from this program list within two years)</b>			
<b>Career Pathway Program</b>	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 utilizes NCCER's four-level curriculum that covers topics such as Plumbing Tools, Types of Valves, and Potable Water Treatment.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NCCER Core</li> <li>• NCCER Plumbing Level 1</li> <li>• NCCER Plumbing Level 2 &amp; up as recommended by Advisory Committee</li> <li>• NCCER Pipefitting Level 1</li> <li>• NCCER Pipefitting Level 2 &amp; up as recommended by Advisory Committee</li> </ul>	<ul style="list-style-type: none"> <li>• Pipefitter</li> <li>• Plumber</li> <li>• Industrial Maintenance Mechanic</li> </ul>
430091	Plumbing and Pipefitting I		
430092	Plumbing and Pipefitting II		
430093	Plumbing and Pipefitting III		
410011	Safety and Health Regulations		
432910	CTE Lab in Architecture & Construction		
430129	Senior Career Pathway Project-Architecture & Construction		

<b>Heating, Ventilation, Air Conditioning, and Refrigeration Program</b> <b>(Must teach three courses from this program list within two years)</b>			
<b>Career Pathway Program</b>	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 utilizes NCCER's curriculum that has 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.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NCCER Core</li> <li>• NCCER Level 1</li> <li>• NCCER Level 2 &amp; up as recommended by Advisory Committee</li> <li>• Air Conditioning Heating and Refrigeration Institute (AHRI) ICE - Residential Core</li> </ul>	<ul style="list-style-type: none"> <li>• HVACR Installer</li> <li>• HVACR Service Technician</li> </ul>
432601	NCCER HVAC 1		
432602	NCCER HVAC 2		
432603	NCCER HVAC 3		
410011	Safety and Health Regulations		
432910	CTE Lab in Architecture & Construction		
430129	Senior Career Pathway Project-Architecture & Construction		

<b>Utility Line Worker Program</b> <b>(Must teach three courses from this program list within two years)</b>			
<b>Career Pathway Program</b>	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.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NCCER Core</li> <li>• NCCER Level 1 (selected modules)</li> <li>• Construction and Skilled Test (CAST)</li> </ul>	<ul style="list-style-type: none"> <li>• Utility Line Worker (electrical or telecommunications)</li> </ul>
431010	Utility Line Workers Foundation		
431011	Utility Line Workers Level 1		
431012	Utility Line Workers Level 2		
410011	Safety and Health Regulations		
432910	CTE Lab in Architecture & Construction		
430129	Senior Career Pathway Project-Architecture & Construction		

<b>SREB AC Clean Energy Program</b> <b>(Must teach three courses from this program list within two years)</b>			
<b>Career Pathway Program</b>	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, water power, energy harvesting, fuel cells and nuclear power. Students use an engineering design process to develop solutions to these authentic problems.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing		<ul style="list-style-type: none"> <li>• Engineer</li> </ul>
590001	Clean Energy Systems		
590002	Clean Energy Applications		
590003	Clean Energy Strategies		
590004	Clean Energy Innovations		
410011	Safety and Health Regulations		
430129	Senior Career Pathway Project-Architecture & Construction		

<b>SREB AC Energy and Power</b>			
<b>(Must teach three courses from this program list within two years)</b>			
<b>Career Pathway Program</b>	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.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing		<ul style="list-style-type: none"> <li>• Engineer</li> </ul>
560112	Energy and Power Foundations SREB		
560113	Energy Transmission and Distribution SREB		
560114	Electronics and Control Systems SREB		
410011	Safety and Health Regulations		
430129	Senior Career Pathway Project-Architecture & Construction		

<b>Heavy Equipment Operation</b>			
<b>(Must teach three courses from this program list within two years)</b>			
<b>Career Pathway Program</b>	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.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	NCCER CORE NCCER Heavy Equipment Operations	<ul style="list-style-type: none"> <li>• Heavy Equipment Operator</li> </ul>
570062	NCCER Heavy Equipment Operations 1		
570063	NCCER Heavy Equipment Operations 2		
570064	NCCER Heavy Equipment Operations 3		
432910	CTE Lab in Architecture & Construction		
410011	Safety and Health Regulations		
430129	Senior Career Pathway Project-Architecture & Construction		

## Arts, A/V, Communications Cluster Program Guides

The Arts, Audio-Video Technology, and Communications cluster engages students in challenging curricula where they are able to develop technical skills in the areas of graphic arts, television production, animation, advertising design, and commercial photography within a safe and innovative setting. Students who choose to complete a pathway in this cluster have the ability to comprehend course materials and complete laboratory work, projects, and assignments related to the cluster. Courses in this cluster provide students with the knowledge and skills for further education and for employment. Students use current and emerging technology, observe modeling and mastery of competencies, and develop and apply skills required for success in their chosen fields. Students work together to build a community of learning where their ideas become a source of learning.

<b>Graphic Arts Program</b> (Must teach three courses from this program list within two years)			
Graphic Arts (Printing) provides students with information regarding safety, image preparation, press operations, and finishing operations in a laboratory setting. Students learn skills enabling them to enter specialized advanced graphic arts courses. These include Digital File Preparation; Advanced Digital File Preparation; Camera, Image Assembly, and Plate Making; Offset Press Operations; and Binding and Finishing.			
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
440004	Foundation of Arts, Audio-Video Technology and Communication	<ul style="list-style-type: none"> <li>• PrintED-Digital File Preparation &amp; Digital File Output</li> <li>• PrintED-Offset Press Operations/Binding &amp; Finishing</li> <li>• PrintED-Graphic Communications</li> <li>• PrintEd-Screen Print</li> <li>• Adobe-Photoshop Certified Associate</li> <li>• Adobe-Illustrator Certified Associate</li> <li>• Adobe-InDesign Certified Associate</li> </ul>	<ul style="list-style-type: none"> <li>• Bindery/Finishing Machine Operator</li> <li>• Desktop/Prepress Specialist</li> <li>• Digital Image/Photo Specialist</li> <li>• Graphic Designer</li> <li>• Press Operator</li> <li>• Printing Estimator</li> <li>• Production Scheduler</li> <li>• Screen Printing Specialist</li> <li>• Vinyl Graphics Specialist</li> </ul>
440011	Introduction to Graphic Arts		
440012	Digital File Preparation		
440013	Advanced Digital File Preparation and Output		
440014	Camera, Image Assembly, and Platemaking		
440015	Offset Press Operations		
440016	Binding and Finishing		
440055	CTE Lab in Arts AV, TV, & Communication		
440054	Senior Career Pathway Project-Arts, A/V Tech & Communications		

<b>Television Production Program</b> (Must teach three courses from this program list within two years)				
Television Production provides students with a basic overview of television production skills and professions. Students participate in classroom and laboratory activities regarding all aspects of television performance, production, and operations. Students are also exposed to a variety of real-world learning opportunities through laboratory experiences in photography and editing. Students perform specialized roles in a regularly scheduled television program to include Television Production—Writing, Producing, and Performing, and Television Production—Studio Operations.				
Career Pathway Program	Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
	440004	Foundation of Arts, Audio-Video Technology and Communication	<ul style="list-style-type: none"> <li>• Adobe-Photoshop Certified Associate</li> <li>• Adobe-Premiere Pro Certified Associate</li> <li>• Apple Final Cut Pro-Certified Pro-Level One</li> <li>• Apple Aperture-Certified Pro-Level One</li> <li>• Apple Motion-Certified Pro-Level One</li> <li>• Certified Broadcast Technologist</li> </ul>	<ul style="list-style-type: none"> <li>• Editing/Postproduction Specialist</li> <li>• News Broadcaster</li> <li>• News Writer/Editor</li> <li>• Production Assistant</li> <li>• Set Design &amp; Lighting</li> <li>• Sound Specialist</li> <li>• Television/Video Camera Operator</li> </ul>
	440017	Introduction to Television Production		
	440018	Television-Writing, Producing, and Performing		
	440019	Television Production - Studio Operations		
	440020	Television Production - Photography and Editing		
	440021	Advanced Television Production		
	440055	CTE Lab in Arts AV, TV, & Communication		
	440054	Senior Career Pathway Project - Arts, A/V Tech & Communications		

<b>Advertising Design Program</b> <b>(Must teach three courses from this program list within two years)</b>			
<b>Career Pathway Program</b>	Advertising Design provides students with orientation experiences and laboratory safety for working in an advertising design studio environment. Topics of study include art history, art production, art criticism, design elements and principles, and materials and media utilized in the field of visual communication. Particular emphasis is placed on related academic skills. Instruction also includes information regarding various computer operations, applications and procedures, type styles, desktop publishing, layout and design techniques, mechanical production files, formats, and technology in the work place.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
440004	Foundation of Arts, Audio-Video Technology and Communication	<ul style="list-style-type: none"> <li>• Adobe-Photoshop Certified Associate</li> <li>• Adobe-Premiere Pro Certified Associate</li> <li>• Adobe-Illustrator Certified Associate</li> <li>• Adobe-Flash Certified Associate</li> <li>• Certified Internet Webmaster E-Commerce</li> <li>• Certified Webmaster Enterprise Developer</li> <li>• Certified Internet Webmaster E-Commerce</li> <li>• Certified Internet Webmaster Site Designer</li> <li>• Macromedia Dreamweaver 9 Developer</li> <li>• Macromedia Flash MX2004 Designer</li> <li>• Microsoft Certified Professional + Internet (MCP+I)</li> <li>• Microsoft Certified Professional Site Building (MCP+Site Building)</li> <li>• Web Communication using Adobe Dreamweaver</li> <li>• PrintED Advertising Design</li> </ul>	<ul style="list-style-type: none"> <li>• Art Director</li> <li>• Digital Creative Specialist</li> <li>• Digital Marketing Specialist</li> <li>• Graphic Designer</li> <li>• Media Strategist/Coordinator</li> <li>• Motion Graphics Designer</li> <li>• Production Artist</li> <li>• Visual Designer</li> </ul>
440031	Introduction to Advertising Design		
440032	Digital Design		
440033	Graphic Illustration		
440034	Studio and Portfolio		
440055	CTE Lab in Arts AV, TV, & Communication		
440054	Senior Career Pathway Project - Arts, A/V Tech & Communications		

<b>Animation Program</b> <b>(Must teach three courses from this program list within two years)</b>			
Animation introduces students to the animation industry. Emphasis is placed on safety in a laboratory and studio environment. Students apply the principles of animation to visually communicate thoughts, feelings, and ideas. Topics of study include animation history, criticism, production, and materials and media utilized in the field.			
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
440004	Foundation of Arts, Audio-Video Technology and Communication	<ul style="list-style-type: none"> <li>• Adobe-Photoshop Certified Associate</li> <li>• Adobe-Premiere Pro Certified Associate</li> <li>• Adobe-Illustrator Certified Associate</li> <li>• Adobe-InDesign Certified Associate</li> <li>• Autodesk-AutoCAD Certified User</li> <li>• Autodesk-Inventor Certified User</li> <li>• Autodesk-Revit Certified User</li> <li>• SolidWorks Associate</li> <li>• SolidEdge Certified Associate</li> </ul>	<ul style="list-style-type: none"> <li>• Architectural Rendering Specialist</li> <li>• Art Director</li> <li>• Game Design/Creative Design</li> <li>• Graphic Designer</li> <li>• Media Specialist</li> <li>• Motion Graphics Specialist</li> <li>• Production Assistant</li> <li>• Technical Illustrator</li> </ul>
440041	Introduction to Animation and Visual Communication		
440042	Animation Layout		
440043	Animation Character Development and Design		
440044	Storyboarding		
440045	Character Animation		
440046	Animated Filmmaking		
440047	Advanced Animation Portfolio		
440055	CTE Lab in Arts AV, TV, & Communication		
440054	Senior Career Pathway Project - Arts, A/V Tech & Communications		

<b>Commercial Photography</b> <b>(Must teach three courses from this program list within two years)</b>			
Commercial Photography provides students with the opportunity to experience practical training in current and emerging photographic technology. The curriculum is based on industry standards designed to provide specialized skills and technical knowledge relevant to photography. Students focus on essential elements in camera, film development, darkroom procedures, safety, history, and composition principles.			
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
440004	Foundation of Arts, Audio-Video Technology and Communication	<ul style="list-style-type: none"> <li>• Adobe-Photoshop Certified Associate</li> <li>• Adobe-Illustrator Certified Associate</li> <li>• Adobe-Premiere Pro Certified Associate</li> <li>• Adobe-InDesign Certified Associate</li> </ul>	<ul style="list-style-type: none"> <li>• Commercial/Portrait Photographer</li> <li>• Graphic Designer/Developer</li> <li>• Graphics Illustrator</li> <li>• Image Editor</li> <li>• Marketing Specialist</li> <li>• Multimedia Specialist</li> <li>• Videographer</li> <li>• Web Design Specialist</li> </ul>
440051	Introduction to Commercial Photography		
440052	Medium Format Photography		
440053	Large Format Photography		
440055	CTE Lab in Arts AV, TV, & Communication		
440054	Senior Career Pathway Project - Arts, A/V Tech & Communications		

## Manufacturing Cluster Program Guides

The Manufacturing cluster provides the knowledge and skills to equip students for careers in industrial maintenance, manufacturing, electronics, precision machining, and robotics. These courses include significant technical depth and engineering concepts and terminology. The Manufacturing cluster provides a safe and appropriate setting for student exploration and achievement. Students gain knowledge and skills through an active, structured, and stimulating environment coordinated with simulated workplace learning experiences. The Transportation, Distribution, and Logistics cluster learning environment utilizes a variety of physical space to stimulate development of effective cognitive and psychomotor skills. Students experience a wide range of hands-on activities based on authentic representations of expectations found in the workplace. Theory and concepts are taught in proportion to the need for strong application opportunities with emphasis on timely learning experiences that facilitate the transition to skills attainment. Safety, proper tool use, and adherence to procedures are integral components for all student learning experiences.

<b>Industrial Systems and Maintenance E&amp;I Program</b> (Must teach three courses from this program list within two years)			
<b>Career Pathway Program</b>	Industrial maintenance is divided into two distinct pathways, electrical and instrumentation and mechanical. Industrial maintenance technicians are needed in every industry that uses machinery, from automotive assembly plants to computer manufacturers. Not only do they repair and maintain electrical instruments and equipment, they also install and dismantle them. Every time a new appliance leaves a factory or a new car rolls off the line, a skilled industrial maintenance technician played a role in producing it. This program utilizes NCCER curriculum and covers topics such as Fasteners and Anchors, Process Mathematics, Pneumatic Controls, Oxyfuel Cutting, Introduction to Piping Components, and Laser Alignment.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NCCER Core</li> <li>• NCCER Industrial Maintenance E &amp; I Level 1</li> <li>• NCCER Industrial Maintenance E &amp; I Level 2 &amp; up as recommended by Advisory Committee</li> </ul>	<ul style="list-style-type: none"> <li>• Industrial Maintenance Electrical Repair Technician</li> <li>• Industrial Maintenance Instrumentation Repair Technician</li> </ul>
542511	NCCER Industrial Maintenance - E & I 1		
542512	NCCER Industrial Maintenance - E & I 2		
542513	NCCER Industrial Maintenance - E & I 3		
410011	Safety and Health Regulations		
540071	CTE Lab in Manufacturing		
540051	Senior Career Pathway Project - Manufacturing		

<b>Industrial Systems and Maintenance Mechanical Program</b> (Must teach three courses from this program list within two years)			
<b>Career Pathway Program</b>	Industrial maintenance is divided into two distinct pathways, electrical and instrumentation and mechanical. Industrial maintenance technicians are needed in every industry that uses machinery, from automotive assembly plants to computer manufacturers. Not only do they repair and maintain electrical instruments and equipment, they also install and dismantle them. Every time a new appliance leaves a factory or a new car rolls off the line, a skilled industrial maintenance technician played a role in producing it. This program utilizes NCCER curriculum and covers topics such as Fasteners and Anchors, Process Mathematics, Pneumatic Controls, Oxyfuel Cutting, Introduction to Piping Components, and Laser Alignment.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NCCER Core</li> <li>• NCCER Industrial Maintenance Mechanic Level 1</li> <li>• NCCER Industrial Maintenance Mechanic Level 2 &amp; 7 up as recommended by Advisory Committee</li> </ul>	<ul style="list-style-type: none"> <li>• Pipefitting Technician</li> <li>• Industrial Maintenance Mechanical Repair Technician</li> </ul>
545221	NCCER Industrial Maintenance - Mechanical 1		
542522	NCCER Industrial Maintenance - Mechanical 2		
542523	NCCER Industrial Maintenance - Mechanical 3		
410011	Safety and Health Regulations		
540071	CTE Lab in Manufacturing		
540051	Senior Career Pathway Project - Manufacturing		

<b>Precision Machining Program</b> (Must teach three courses from this program list within two years)			
<b>Career Pathway Program</b>	Precision machinists Set up and operate a variety of machine tools to produce precision parts and instruments. The precision machining curriculum includes necessary skills for students to fabricate, modify, or repair mechanical instruments.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• NIMS Level 1 Measurement, Materials &amp; Safety</li> <li>• NIMS Level 1 Job Planning, Benchwork &amp; Layout</li> <li>• NIMS Level 1 Manual Milling Skills</li> <li>• NIMS Level 1 turning Operations: turning Between Centers</li> <li>• NIMS Level 1 Turning Operations: Turning Chucking Skills</li> <li>• NIMS Level 1 Grinding Skills</li> <li>• NIMS Level 1 Drill Press Skills</li> <li>• NIMS Level 1 CNC Turning: Programming Setup &amp; Operations</li> <li>• NIMS Level 1 CNC Milling: Programming Setup &amp; Operations</li> <li>• NIMS Level 1 Turning: Operations</li> <li>• NIMS Level 1 Milling Operations</li> <li>• MSSC CPT</li> </ul>	<ul style="list-style-type: none"> <li>• Precision Machinist</li> <li>• CNC Machinist</li> </ul>
540004	Introduction to Manufacturing		
540041	Introduction to Precision Machining		
540042	Introduction to Computer Numerical Control		
540043	Intermediate Computer Numerical Control		
540044	Computer-Aided Design and Computer-Aided Manufacturing I		
540045	Computer-Aided Design and Computer-Aided Manufacturing II		
540046	Coordinate Measuring Machine		
540047	Introduction to Lathe		
540048	Introduction To Milling, Drill Press, and Surface and Grinder		
540049	Intermediate Lathe and Bench Work		
540050	Intermediate Mill and Surface Grinder		
410011	Safety and Health Regulations		
540071	CTE Lab in Manufacturing		
540051	Senior Career Pathway Project - Manufacturing		



<b>Career Pathway Program</b>	<b>Electronics Program</b> <b>(Must teach three courses from this program list within two years)</b>		
	The electronics program covers a variety of topics including: Electrical Theory; Electronic Components; Soldering-Desoldering and Tools; Block Diagrams-Schematics-Wiring Diagrams; Cabling; Power Supplies; Test Equipment and Measurements; Safety Precautions; Mathematics and Formulas; Electronic Circuits; Series and Parallel; Amplifiers; Interfacing of Electronics Products, Digital Concepts and Circuitry; Computer Electronics; Computer Applications; Audio & Video Systems; Optical Electronics; Basic Telecommunications; and Technician Work Procedures. Students will be prepared to earn entry level credentials recognized by the Electronics Technicians Association (ETA).		

Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• Electronics Technicians Association - Student Electronics Technician</li> <li>• Electronics Technicians Association - Basic DC</li> <li>• Electronics Technicians Association - Basic AC</li> <li>• Electronics Technicians Association - Basic Analog</li> <li>• Electronics Technicians Association - Basic Digital</li> <li>• Electronics Technicians Association – Comprehensive</li> <li>• NCCER Electronic Systems Technician, Electronics</li> <li>• NCCER Core</li> </ul>	<ul style="list-style-type: none"> <li>• Electronics Repair Technician</li> <li>• Electronics Installer</li> </ul>
540004	Introduction to Manufacturing		
430058	Direct Current		
430059	Alternating Current		
540015	Semiconductors		
540021	Digital Electronics		
560114	Electronics and Control Systems		
540031	Introduction to Robotics		
540032	Robotics Applications		
540068	Robotics and Automation		
540066	Telecommunications Cabling		
540067	Embedded Arduino Controls and Robotics Applications		
410011	Safety and Health Regulations		
540071	CTE Lab in Manufacturing		
540051	Senior Career Pathway Project - Manufacturing		

<b>Manufacturing Technologies Program</b> <b>(Must teach three courses from this program list within two years)</b>			
Manufacturing Technologies is designed to prepare students for entry level positions in manufacturing. These Courses are built upon MSSC's curriculum which includes modular courses for: Safety, Quality Practices & Measurement, Manufacturing Production & Processes, Maintenance Awareness, and Green Production.			

Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• FANUC</li> <li>• NCCER Core</li> </ul>	<ul style="list-style-type: none"> <li>• Manufacturing Operations Technician</li> <li>• Manufacturing Operations Manager</li> </ul>
540061	Manufacturing 1		
540062	Manufacturing 2		
540062	Manufacturing 3	<ul style="list-style-type: none"> <li>• MSSC CPT</li> </ul>	
540071	CTE Lab in Manufacturing		
540051	Senior Career Pathway Project - Manufacturing		
410011	Safety and Health Regulations		

<b>SREB AC Integrated Production Technology Program</b> <b>(Must teach three courses from this program list within two years)</b>			
Advanced Career's STEM curriculum — Integrated Production Technologies — engages students in using innovative industry driven technologies to imagine and design new and improved products. Great entry-level jobs leading to challenging, high-paying careers are available across the nation for students who have the academic and technical knowledge and skill sets to succeed. Students also need creativity and problem-solving abilities to coordinate information and analyze data. With these skill sets, students will be prepared to dream, build and maintain cyber-mechanical systems; invent unmanned exploration vehicles; apply electrical and mechanical engineering principles to the construction of production systems; and use logistics to develop solutions to the modern world's most pressing needs and wants..			

Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
430004	Architecture, Construction, and Manufacturing	<ul style="list-style-type: none"> <li>• FANUC</li> <li>• NCCER Core</li> </ul>	<ul style="list-style-type: none"> <li>• FANUC</li> <li>• Manufacturing Operations Technician</li> <li>• Manufacturing Operations Manager</li> </ul>
540061	Manufacturing 1		
540062	Manufacturing 2		
540062	Manufacturing 3	<ul style="list-style-type: none"> <li>• MSSC</li> </ul>	
540071	CTE Lab in Manufacturing		
540051	Senior Career Pathway Project - Manufacturing		
410011	Safety and Health Regulations		

## STEM Cluster Program Guides

Students choosing to enter this cluster will learn the close relationship of mathematics and science to the engineering and technology disciplines and should expect to regularly apply mathematics and scientific principles throughout the courses in this cluster. They enjoy challenging curricula involving practical applications of engineering principles and technological literacy. Knowledge gained by students in this cluster includes science and mathematics principles applicable to engineering and engineering-related careers. As technology continues its rapid expansion, adequately preparing students for engineering-related careers is essential and serves as the primary purpose of this cluster. The Science, Technology, Engineering, and Mathematics cluster classroom and laboratory provide safe and appropriate settings for student exploration and learning. The structured, yet active environment stimulates students' creativity and helps them develop the necessary skills for future employment.

Career Pathway Program	Engineering Program (Must teach three courses from this program list within two years)		
	Engineering is designed to offer students an overview of the engineering profession and fundamental skills utilized in general engineering. Students investigate various engineering disciplines and related career paths. They develop communication and teamwork skills as well as increase their understanding of basic scientific and mathematics principles used in problem solving through the engineering design process. Students will also explore the application of engineering principles in various technological areas including construction, transportation, communication, manufacturing, and bioengineering. Students will also learn about systems involved in the engineering research and design process. Topics include fluid, thermal, mechanical, and electrical systems.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
560011	Foundations of Engineering	<ul style="list-style-type: none"> <li>• Autodesk Inventor Certified User</li> <li>• Autodesk-AutoCAD certified user</li> <li>• Autodesk-Revit Certified User</li> <li>• SolidWorks Associate</li> <li>• SolidEdge Certified Associate</li> <li>• FANUC</li> </ul>	<ul style="list-style-type: none"> <li>• All Disciplines Engineer/Technician</li> <li>• Aerospace Engineer/Technician</li> <li>• Aesthetics Specialist</li> <li>• Architectural Engineer/Technician</li> <li>• Civil Engineer/Technician</li> <li>• Control Systems Engineer/Technician</li> <li>• Electrical Engineer/Technician</li> <li>• Ergonomics Specialist</li> <li>• Industrial Design</li> <li>• Manufacturing Engineer/Technician</li> <li>• Mechanical Engineer/Technician</li> <li>• Robotics Engineer/Technician</li> </ul>
560012	Engineering Applications		
560013	Engineering Systems		
560014	Engineering Research and Design		
560030	Basic Programming for Engineers		
540031	Introduction to Robotics		
540032	Robotics Applications		
560118	CTE Lab in STEM		
560111	Senior Career Pathway Project-Science, Technology, Engineering & Math		

Career Pathway Program	Project Lead the Way (PLTW) Engineering Program (Must teach three courses from this program list within two years)		
	From launching space explorations to delivering safe, clean water to communities, engineers find solutions to pressing problems and turn their ideas into reality. PLTW Engineering empowers students to step into the role of an engineer, adopt a problem-solving mindset, and make the leap from dreamers to doers. The program's courses engage students in compelling, real-world challenges that help them become better collaborators and thinkers. Students take from the courses in-demand knowledge and skills they will use in high school and for the rest of their lives, on any career path they take.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
560015	Introduction to Engineering Design-PLTW	<ul style="list-style-type: none"> <li>• Autodesk Inventor Certified User</li> <li>• Autodesk-AutoCAD certified user</li> <li>• Autodesk-Revit Certified User</li> <li>• SolidWorks Associate</li> <li>• SolidEdge Certified Associate</li> <li>• FANUC</li> </ul>	<ul style="list-style-type: none"> <li>• All Disciplines Engineer/Technician</li> <li>• Aerospace Engineer/Technician</li> <li>• Aesthetics Specialist</li> <li>• Architectural Engineer/Technician</li> <li>• Civil Engineer/Technician</li> <li>• Control Systems Engineer/Technician</li> <li>• Electrical Engineer/Technician</li> <li>• Ergonomics Specialist</li> <li>• Industrial Design</li> <li>• Manufacturing Engineer/Technician</li> <li>• Mechanical Engineer/Technician</li> <li>• Robotics Engineer/Technician</li> </ul>
560016	Principles of Engineering-PLTW		
560017	Digital Electronics-PLTW		
560018	Aerospace Engineering-PLTW		
560019	Biotechnical Engineering-PLTW		
560020	Civil Engineering and Architecture-PLTW		
560021	Computer Integrated Manufacturing-PLTW		
560022	Engineering Design and Development-PLTW		
560028	Environmental Sustainability-PLTW		
560118	CTE Lab in STEM		
560111	Senior Career Pathway Project-Science, Technology, Engineering & Math		

Career Pathway Program	SREB AC Aerospace Engineering (Must teach three courses from this program list within two years)		
	Schools are challenged to better prepare students for a wide array of postsecondary options. The workforce of today and tomorrow demands a higher level of skill — people who grasp complex problems, understand technology and troubleshoot problems. Advanced Career (AC) answers both of these needs. By fusing a rigorous academic core with challenging project work and advanced technology in a career pathway program of study, AC courses give students a greater depth of knowledge and skills and prepare them for more options after high school.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
560007	Fundamentals of Aerospace Technology-SREB AC		<ul style="list-style-type: none"> <li>• All Disciplines Engineer/Technician</li> <li>• Aerospace Engineer/Technician</li> <li>• Aesthetics Specialist</li> <li>• Architectural Engineer/Technician</li> <li>• Civil Engineer/Technician</li> </ul>
560008	Advanced Aerospace Technology-SREB AC		
560109	Aerospace Engineering Applications-SREB AC		
560110	Advanced Aeronautics-SREB AC		
560118	CTE Lab in STEM		

560111	Senior Career Pathway Project-Science, Technology, Engineering & Math		<ul style="list-style-type: none"> <li>• Control Systems Engineer/Technician</li> <li>• Electrical Engineer/Technician</li> <li>• Ergonomics Specialist</li> <li>• Industrial Design</li> <li>• Manufacturing Engineer/Technician</li> <li>• Mechanical Engineer/Technician</li> <li>• Robotics Engineer/Technician</li> </ul>

<b>SREB AC Innovations in Science and Technology Program</b> <b>(Must teach three courses from this program list within two years)</b>			
<b>Career Pathway Program</b>	The Innovations in Science and Technology program will develop students' technological literacy and stimulate their interest in pursuing a career in science, technology, engineering and mathematics (STEM). This STEM program will provide students with the knowledge and hands-on experiences they need to be successful in the new global workforce. The ideal candidate for this curriculum has an enthusiastic curiosity and enjoys challenges that involve solving complex real-world problems.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
590301	The Nature of Science and Technology SREB AC		<ul style="list-style-type: none"> <li>• All Disciplines Engineer/Technician</li> <li>• Aerospace Engineer/Technician</li> <li>• Aesthetics Specialist</li> <li>• Architectural Engineer/Technician</li> <li>• Civil Engineer/Technician</li> <li>• Control Systems Engineer/Technician</li> <li>• Electrical Engineer/Technician</li> <li>• Ergonomics Specialist</li> <li>• Industrial Design</li> <li>• Manufacturing Engineer/Technician</li> <li>• Mechanical Engineer/Technician</li> <li>• Robotics Engineer/Technician</li> </ul>
590302	Core Applications of Science and Technology		
590303	Impacts of Science and Technology		
590304	Creativity and Innovations		
560118	CTE Lab in STEM		
560111	Senior Career Pathway Project-Science, Technology, Engineering & Math		

<b>Career Clusters Technologies</b> <b>(Must teach three courses from this program list within two years)</b>			
<b>Career Pathway Program</b>	Engineering is designed to offer students an overview of the engineering profession and fundamental skills utilized in general engineering. Students investigate various engineering disciplines and related career paths. They develop communication and teamwork skills as well as increase their understanding of basic scientific and mathematics principles used in problem solving through the engineering design process. Students will also explore the application of engineering principles in various technological areas including construction, transportation, communication, manufacturing, and bioengineering. Students will also learn about systems involved in the engineering research and design process. Topics include fluid, thermal, mechanical, and electrical systems.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
400011	Career Cluster Technologies I (35 instructional-hour course) Grade 7		<ul style="list-style-type: none"> <li>• All Disciplines Engineer/Technician</li> <li>• Aerospace Engineer/Technician</li> <li>• Aesthetics Specialist</li> <li>• Architectural Engineer/Technician</li> <li>• Civil Engineer/Technician</li> <li>• Control Systems Engineer/Technician</li> <li>• Electrical Engineer/Technician</li> <li>• Ergonomics Specialist</li> <li>• Industrial Design</li> <li>• Manufacturing Engineer/Technician</li> <li>• Mechanical Engineer/Technician</li> <li>• Robotics Engineer/Technician</li> </ul>
400012	Career Cluster Technologies (70 instructional-hour course) Grade 7		
400013	Career Cluster Technologies I (140 instructional-hour course) Grade 7		
400014	Career Cluster Technologies II (70 instructional-hour course) Grade 8		
400015	Career Cluster Technologies III (70 instructional-hour course) Grade 8		

<b>PLTW Middle School</b>			
<b>(Must teach three courses from this program list within two years)</b>			
<b>Career Pathway Program</b>	From launching space explorations to delivering safe, clean water to communities, engineers find solutions to pressing problems and turn their ideas into reality. PLTW Engineering empowers students to step into the role of an engineer, adopt a problem-solving mindset, and make the leap from dreamers to doers. The program's courses engage students in compelling, real-world challenges that help them become better collaborators and thinkers. Students take from the courses in-demand knowledge and skills they will use in high school and for the rest of their lives, on any career path they take.		
<b>Code Number</b>	<b>Career Pathway Program Courses</b>	<b>Career Readiness Indicator (CRI)</b>	<b>Workforce Careers</b>
560001	Design and Modeling - PLTW		<ul style="list-style-type: none"> <li>• All Disciplines Engineer/Technician</li> <li>• Aerospace Engineer/Technician</li> <li>• Aesthetics Specialist</li> <li>• Architectural Engineer/Technician</li> <li>• Civil Engineer/Technician</li> <li>• Control Systems Engineer/Technician</li> <li>• Electrical Engineer/Technician</li> <li>• Ergonomics Specialist</li> <li>• Industrial Design</li> <li>• Manufacturing Engineer/Technician</li> <li>• Mechanical Engineer/Technician</li> <li>• Robotics Engineer/Technician</li> </ul>
560002	Magic of Electrons - PLTW		
560003	Automation and Robotics - PLTW		
560004	Energy and the Environment - PLTW		
560005	Flight and Space - PLTW		
560006	Science and Technology - PLTW		
560023	Medical Detectives - PLTW		
560029	App Creators-PLTW		
560031	Green Architecture		
560032	Computer Science for Innovators and Makers-PLTW		

### Transportation, Distribution, and Logistics Cluster Program Guides

The Transportation, Distribution, and Logistics cluster includes specialty areas in aviation, power equipment, automotive service, automotive collision repair, diesel engine maintenance and repair, logistics, and marine technology. The curriculum is based on recognized industry and professional standards found in national organizations and federal regulations.

<b>Automotive Services Program</b>			
<b>(Must teach three courses from this program list within two years)</b>			
	The need for automotive service technicians is growing rapidly as people continue to keep their vehicles in operation longer than ever before. This program is designed for students to gain knowledge and credentials for entry level employment or to continue their education through college. This program is divided into three levels; Maintenance and Light Repair, Automotive Service Technicians, and Master Service Technicians. All programs are NATEF accredited and students are eligible to receive ASE credentials.		
<b>Code Number</b>	<b>Career Pathway Program Courses</b>	<b>Career Readiness Indicator (CRI)</b>	<b>Workforce Careers</b>
570004	Transportation, Distribution, and Logistics	<ul style="list-style-type: none"> <li>• ASE Student Maintenance and Light Repair</li> <li>• ASE Student Suspension and Steering</li> <li>• ASE Student Brakes</li> <li>• ASE Electrical/Electronic Systems</li> <li>• ASE Student Engine Performance</li> <li>• ASE Electrical/Electronic Systems</li> <li>• ASE Student Engine Repair</li> <li>• ASE Student Automatic Transmission/Transaxle</li> <li>• ASE Student Heating and Air Conditioning</li> <li>• ASE Manual Drive Train and Axles</li> <li>• ASE Automotive Service Technician</li> </ul>	<ul style="list-style-type: none"> <li>• Maintenance and Light Repair Technician</li> <li>• Automotive Service Technician</li> <li>• Master Automotive Service Technician</li> </ul>
570071	Maintenance and Light Repair A		
570072	Maintenance and Light Repair B		
570073	Maintenance and Light Repair C		
570074	Maintenance and Light Repair D		
570075	Automotive Service Technology A		
570076	Automotive Service Technology B		
570077	Automotive Service Technology C		
570078	Automotive Service Technology D		
570079	Master Automotive Service Technology		
410011	Safety and Health Regulations		
570087	CTE Lab in Transportation, Distribution & Logistics		
570080	Senior Career Pathway Project-Transportation, Distribution & Logistics		

<b>Aviation Technology Program</b>			
<b>(Must teach three courses from this program list within two years)</b>			
	The Aviation Technology program is designed to prepare students to continue their education in aviation technology at the college level. Students learn various skills including avionics, sheet metal, engine theory and much more. Careers related to aviation technology continue to rise each year.		
<b>Code Number</b>	<b>Career Pathway Program Courses</b>	<b>Career Readiness Indicator (CRI)</b>	<b>Workforce Careers</b>
570004	Transportation, Distribution, and Logistics		<ul style="list-style-type: none"> <li>• Avionics Technician</li> <li>• Aircraft Mechanic</li> <li>• Helicopter Mechanic</li> </ul>
570010	Airframe Systems		
570011	Aircraft Non-Metallic Structures		
570012	Aircraft Theory of Flight and Operation		
570013	Aviation Turbine Engine Theory and Inspections		
570014	Aircraft Engine & Propeller Theory and Operation		
570015	Aircraft Sheet Metal Structures		
570017	Aircraft Welding		
410011	Safety and Health Regulations		
570087	CTE Lab in Transportation, Distribution & Logistics		
570080	Senior Career Pathway Project-Transportation, Distribution & Logistics		

<b>Collision Repair Program</b> <b>(Must teach three courses from this program list within two years)</b>			
<b>Career Pathway Program</b>	The collision repair program is divided into two divisions, collision repair and refinishing. This program is designed to train students to successful repair accidental damage and to refinish vehicles. Emphasis is placed on safety, plasma arc cutting and oxyacetylene cutting, resistance type spot welding, and metal inert gas (MIG) welding. This course incorporates all personal and environmental safety practices associated with clothing; respiratory protection; eye protection; tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations. Refinishing skills learned in this program may also carry over into many other industries through manufacturing finishing of products. All programs are NATEF accredited and students are eligible to receive ASE credentials. ICAR curriculum and credentials are being utilized in many programs.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
570004	Transportation, Distribution, and Logistics	<ul style="list-style-type: none"> <li>• ASE Student Painting and Refinishing</li> <li>• ASE Student Non-structural Analysis and Damage Repair</li> <li>• ASE Student Mechanical and Electrical</li> <li>• ICAR Auto Refinish Platinum</li> <li>• ICAR Intro to Collision Repair</li> <li>• ICAR Non-Structural Platinum</li> </ul>	<ul style="list-style-type: none"> <li>• Collision Refinishing Technician</li> <li>• Structural Repair Technician</li> <li>• Nonstructural Repair Technician</li> <li>• Manufacturing Assembly Specialist</li> <li>• Manufacturing Finishing Specialist</li> </ul>
570081	Introduction to Collision Repair-ICAR		
570082	Non-structural Technician A-ICAR		
570083	Non-structural Technician B-ICAR		
570084	Refinishing Technician A-ICAR		
570085	Refinishing Technician B-ICAR		
570086	Refinishing Technician C-ICAR		
570030	Painting and Refinishing I		
570031	Painting and Refinishing II		
570032	Painting and Refinishing III		
570033	Nonstructural Analysis and Damage Repair I		
570034	Nonstructural Analysis and Damage Repair II		
570035	Structural Analysis and Damage Repair		
570036	Mechanical and Electrical Components I		
570037	Mechanical and Electrical Components II		
570038	Collision Repair-Metal Welding and Cutting		
410011	Safety and Health Regulations		
570087	CTE Lab in Transportation, Distribution & Logistics		
570080	Senior Career Pathway Project-Transportation, Distribution & Logistics		

<b>Diesel Technology Program</b> <b>(Must teach three courses from this program list within two years)</b>			
The Diesel Technology Program is designed for students to gain knowledge and experience related to servicing heavy equipment and medium/heavy duty trucks. Emphasis is placed on diesel engines, electrical, HVAC, hydraulics and preventative maintenance and light repair. All programs are NATEF accredited and students are eligible to receive ASE credentials.			
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
570004	Transportation, Distribution, and Logistics	<ul style="list-style-type: none"> <li>• ASE Student Diesel Engines</li> <li>• ASE Student Electrical/Electronic Systems</li> <li>• ASE Student Brakes</li> <li>• ASE Student Steering &amp; Suspension</li> </ul>	<ul style="list-style-type: none"> <li>• Diesel Truck Technician</li> <li>• Heavy Equipment Technician</li> <li>• Generator Service Technician</li> </ul>
570040	Diesel Engines I		
570041	Diesel Engines II		
570042	Diesel Drive Train		
570043	Diesel Electrical and Electronic Systems I		
570044	Diesel Electrical and Electronic Systems II		
570045	Diesel Brakes		
570046	Diesel Suspension and Steering		
570047	Diesel Hydraulics		
570048	Diesel HVAC		
570049	Diesel Preventative, Maintenance, and Inspection (PMI)		
410011	Safety and Health Regulations		
570087	CTE Lab in Transportation, Distribution & Logistics		
570080	Senior Career Pathway Project-Transportation, Distribution & Logistics		

<b>Power Equipment Program</b> <b>(Must teach three courses from this program list within two years)</b>			
The Power Equipment program is designed to prepare students for entry-level employment or advanced training in the power mechanics field. Topics include career opportunities, safety, tools, hydraulics, pneumatics, drivetrains, control systems, starters, and preventive maintenance.			
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
570004	Transportation, Distribution, and Logistics	<ul style="list-style-type: none"> <li>• Equipment Engine Training Council Two Stroke Engine</li> <li>• Equipment Engine Training Council Four Stroke Engine</li> <li>• Briggs and Stratton Master Service Technician</li> <li>• Equipment Engine Training Council Compact Diesel Engine</li> <li>• Equipment Engine Training Council OPE Electrical</li> </ul>	<ul style="list-style-type: none"> <li>• Small Engine Technician</li> <li>• Motorcycle Technician</li> <li>• Small Engine Assembly Specialist</li> </ul>
410002	Power Equipment Technology		
570060	Advanced Power Equipment Technology		
570061	Recreational Power Equipment Operation		
410022	Residential and Commercial Power Equipment		
410001	Two- and Four-Stroke Engines		
410011	Safety and Health Regulations		
570087	CTE Lab in Transportation, Distribution & Logistics		

570080	Senior Career Pathway Project-Transportation, Distribution & Logistics	<ul style="list-style-type: none"> <li>• Equipment Engine Training Council Driveline/Hydraulics</li> <li>• Equipment Engine Training Council Generator</li> <li>• Husqvarna Certification</li> </ul>	
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Career Pathway Program	SREB AC Global Logistics and Supply Chain Management (Must teach three courses from this program list within two years)		
	Global logistics and supply chain management connect internal functions of an organization with other institutions around the globe. It is vital to understand the roles of logistics and supply chain management in a global economy where individuals and organizations have access to markets across the world. This field requires critical thinking and problem-solving skills to coordinate the movement of goods and services that may be separated by a few feet or thousands of miles. In an industry always striving for optimization, decision-making skills are paramount.		
Code Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	Workforce Careers
570004	Transportation, Distribution, and Logistics		<ul style="list-style-type: none"> <li>• Logistics Technician</li> </ul>
590501	Introduction to Logistics		
590502	Functional Areas in Logistics		
590503	Global Logistics Management		
590504	Logistics and Supply Chain Management		
410011	Safety and Health Regulations		
570080	Senior Career Pathway Project-Transportation, Distribution & Logistics		

### 2018–2019 Subject and Personnel Codes

#### Architecture/Construction Cluster, Manufacturing Cluster, STEM Cluster, Arts/AV Communication, and Transportation, Distribution, & Logistics

Architecture/Construction Cluster Courses			
Code Number	Course Name	Code Number	Course Name
410011	Safety and Health Regulations	432501	NCCER Electrical Technologies 1
430004	Architecture, Construction, and Manufacturing	432502	NCCER Electrical Technologies 2
430129	Senior Career Pathway Project-Architecture & Construction	432503	NCCER Electrical Technologies 3
410005	Introduction to Drafting	432901	NCCER Welding 1
430010	Intermediate Drafting Design	432902	NCCER Welding 2
430011	Advanced Drafting Design	432903	NCCER Welding 3
430012	Structural Drafting	432904	NCCER Welding 4
430013	Introduction to Architectural Design	430091	Plumbing and Pipefitting I
430014	Intermediate Architectural Design	430092	Plumbing and Pipefitting II
430015	Advanced Architectural Design	430093	Plumbing and Pipefitting III
430016	Three-Dimensional Solid Model Design I	432601	NCCER HVAC 1
430017	Three-Dimensional Solid Model Design II	432602	NCCER HVAC 2
412101	NCCER Building Construction 1 - Construction Framing	432603	NCCER HVAC 3
412102	NCCER Building Construction 2 - Site Preparation	431010	Utility Line Workers Foundation
412103	NCCER Building Construction 3 - Construction Finishing	431011	Utility Line Workers Level 1
430021	Cabinetmaking I	431012	Utility Line Workers Level 2
430022	Cabinetmaking II	590001	Clean Energy Systems
430023	Cabinetmaking III	590002	Clean Energy Applications
432301	NCCER Carpentry 1	590003	Clean Energy Strategies
432302	NCCER Carpentry 2	590004	Clean Energy Innovations
432303	NCCER Carpentry 3		
432701	NCCER Masonry 1		
432702	NCCER Masonry 2		
432703	NCCER Masonry 3		
Arts, A/V, Communications Cluster Courses			
Code Number	Course Name	Code Number	Course Name
440004	Foundation of Arts, Audio-Video Technology and Communication	440033	Graphic Illustration
440054	Senior Career Pathway Project-Arts, A/V Tech & Communications	440034	Studio and Portfolio
440011	Introduction to Graphic Arts	440041	Introduction to Animation and Visual Communication
440012	Digital File Preparation	440042	Animation Layout
440013	Advanced Digital File Preparation and Output	440043	Animation Character Development and Design
440014	Camera, Image Assembly, and Platemaking	440044	Storyboarding
440015	Offset Press Operations	440045	Character Animation
440016	Binding and Finishing	440046	Animated Filmmaking
440017	Introduction to Television Production	440047	Advanced Animation Portfolio
440018	Television-Writing, Producing, and Performing	440051	Introduction to Commercial Photography
440019	Television Production - Studio Operations	440052	Medium Format Photography

440020	Television Production - Photography and Editing	440053	Large Format Photography
440021	Advanced Television Production		
440031	Introduction to Advertising Design		
440032	Digital Design		
Manufacturing Cluster Courses			
Code Number	Course Name	Code Number	Course Name
410011	Safety and Health Regulations	540048	Introduction To Milling, Drill Press, and Surface and Grinder
430004	Architecture, Construction, and Manufacturing	540049	Intermediate Lathe and Bench Work
540051	Senior Career Pathway Project - Manufacturing	540050	Intermediate Mill and Surface Grinder
542511	NCCER Industrial Maintenance - E & I 1	430058	Direct Current
542512	NCCER Industrial Maintenance - E & I 2	430059	Alternating Current
542513	NCCER Industrial Maintenance - E & I 3	540015	Semiconductors
545221	NCCER Industrial Maintenance – Mechanical 1	540021	Digital Electronics
545222	NCCER Industrial Maintenance – Mechanical 2	560114	Electronics and Control Systems
545223	NCCER Industrial Maintenance – Mechanical 3	540031	Introduction to Robotics
540004	Introduction to Manufacturing	540032	Robotics Applications
540041	Introduction to Precision Machining	540066	Telecommunications Cabling
540042	Introduction to Computer Numerical Control	540067	Embedded Arduino Controls and Robotics Applications
540043	Intermediate Computer Numerical Control	540068	Robotics and Automation
540044	Computer-Aided Design and Computer-Aided Manufacturing I	540061	Manufacturing 1
540045	Computer-Aided Design and Computer-Aided Manufacturing II	540062	Manufacturing 2
540046	Coordinate Measuring Machine	540063	Manufacturing 3
540047	Introduction to Lathe		

### 2018–2019 Subject and Personnel Codes

#### **Architecture/Construction Cluster, Manufacturing Cluster, STEM Cluster, Arts/AV Communication, and Transportation, Distribution, & Logistics (continued)**

STEM Cluster Courses			
Code Number	Course Name	Code Number	Course Name
560011	Foundations of Engineering	560019	Biotechnical Engineering-PLTW
560012	Engineering Applications	590020	Civil Engineering and Architecture-PLTW
560013	Engineering Systems	560021	Computer Integrated Manufacturing-PLTW
560014	Engineering Research and Design	560022	Engineering Design and Development-PLTW
560030	Basic Programming for Engineers	560007	Fundamentals of Aerospace Technology-SREB AC
560031	Introduction to Robotics	560008	Advanced Aerospace Technology-SREB AC
560032	Robotics Applications	560109	Aerospace Engineering Applications-SREB AC
560015	Introduction to Engineering Design-PLTW	560110	Advanced Astronautics-SREB AC
560016	Principles of Engineering-PLTW	560111	Senior Career Pathway Project-Science, Technology, Engineering & Math
560017	Digital Electronics-PLTW	560028	Environmental Sustainability-PLTW
560018	Aerospace Engineering-PLTW		
Middle School STEM Cluster Courses			
Code Number	Course Name	Code Number	Course Name
560001	Design and Modeling - PLTW	560031	Green Architecture
560002	Magic of Electrons - PLTW	560032	Computer Science for Innovators and Makers-PLTW
560003	Automation and Robotics - PLTW	400011	Career Cluster Technologies I (35 instructional-hour course) Grade 7
560004	Energy and the Environment - PLTW	400012	Career Cluster Technologies (70 instructional-hour course) Grade 7
560005	Flight and Space - PLTW	400013	Career Cluster Technologies I (140 instructional-hour course) Grade 7
560006	Science and Technology - PLTW	400014	Career Cluster Technologies II (70 instructional-hour course) Grade 8
560023	Medical Detectives - PLTW	400015	Career Cluster Technologies III (70 instructional-hour course) Grade 8
560029	App Creators-PLTW		
Transportation, Distribution, and Logistics Cluster Courses			
Code Number	Course Name	Code Number	Course Name
410011	Safety and Health Regulations	570036	Mechanical and Electrical Components I
570004	Transportation, Distribution, and Logistics	570037	Mechanical and Electrical Components II
570080	Senior Career Pathway Project-Transportation, Distribution & Logistics	570038	Collision Repair-Metal Welding and Cutting
570071	Maintenance and Light Repair A	570040	Diesel Engines I
570072	Maintenance and Light Repair B	570041	Diesel Engines II
570073	Maintenance and Light Repair C	570042	Diesel Drive Train
570074	Maintenance and Light Repair D	570043	Diesel Electrical and Electronic Systems I
570075	Automotive Service Technology A	570044	Diesel Electrical and Electronic Systems II

570076	Automotive Service Technology B	570045	Diesel Brakes
570077	Automotive Service Technology C	570046	Diesel Suspension and Steering
570078	Automotive Service Technology D	570047	Diesel Hydraulics
570079	Master Automotive Service Technology	570048	Diesel HVAC
570010	Airframe Systems	570049	Diesel Preventative, Maintenance, and Inspection (PMI)
570011	Aircraft Non-Metallic Structures	410002	Power Equipment Technology
570012	Aircraft Theory of Flight and Operation	570060	Advanced Power Equipment Technology
570013	Aviation Turbine Engine Theory and Inspections	570061	Recreational Power Equipment Operation
570014	Aircraft Engine & Propeller Theory and Operation	410022	Residential and Commercial Power Equipment
570015	Aircraft Sheet Metal Structures	410001	Two- and Four-Stroke Engines
570017	Aircraft Welding	590501	Introduction to Logistics
570030	Painting and Refinishing I	590502	Functional Areas in Logistics
570031	Painting and Refinishing II	590503	Global Logistics Management
570032	Painting and Refinishing III	590504	Logistics and Supply Chain Management
570033	Nonstructural Analysis and Damage Repair I		
570034	Nonstructural Analysis and Damage Repair II		
570035	Structural Analysis and Damage Repair		