# 2025 – 2026

# PROGRAM GUIDE

# MANUFACTURING CLUSTER

ALABAMA STATE DEPARTMENT OF EDUCATION
CAREER AND TECHNICAL EDUCATION
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# Manufacturing Cluster Program Guides

The Manufacturing cluster provides the knowledge and skills to equip students for careers in additive manufacturing, industrial maintenance, electronics, manufacturing, precision machining, and robotics. These courses include significant technical depth, 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 Manufacturing 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.

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

| Career Pathway Program | Additive Manufacturing Program<br>**(Must teach three courses from this program list within two years)**<br>Additive Manufacturing is based upon Computer-Aided-Design and 3-D Printing. This program provides students with the knowledge of Introduction, Intermediate, and Advanced Drafting Design Technology, Three-Dimensional Solid Modeling and Engineering Applications and the skill to be successful in the Mechanical and Technical Design fields. | | |
|---|---|---|---|
| **Course Number** | **Career Pathway Program Courses** | **Career Readiness Indicator (CRI)** | **In Demand Occupations** |
| 21106G1033 | Advanced Drafting Design | • Alabama Certified Employee (ACE)<br>• Autodesk – AutoCAD Certified User<br>• Autodesk – Design for Manufacturing<br>• Autodesk – Fusion 360 Certified User<br>• Autodesk – Inventor Certified User<br>• Autodesk – Inventor for Mechanical Design<br>• Forklift Operator – Skills for Success<br>• Machine Operator – Skills for Success<br>• Operator Technician – Skills for Success<br>• Solid Edge Certified Associate<br>• SolidWorks Associate | • CAD Designer<br>• Mechanical Designer<br>• Technical Designer |
| 13997G1003 | Career Pathway Project in Manufacturing | | |
| 13997G1001 | CTE Lab in Manufacturing | | |
| 21002G1001 | Engineering Design Applications | | |
| 21106G1023 | Intermediate Drafting Design | | |
| 21106G1013 | Introduction to Drafting Design | | |
| 21004G1001 | Introduction to Engineering Design | | |
| 13001G1000 | Introduction to Manufacturing | | |
| 17049G1000 | Safety and Health Regulations | | |
| 21107G1012 | Three-Dimensional Solid Modeling I | | |
| 21107G1022 | Three-Dimensional Solid Modeling II | | |

| Career Pathway Program | Electronics Program<br>**(Must teach three courses from this program list within two years)**<br>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). | | |
|---|---|---|---|
| **Course Number** | **Career Pathway Program Courses** | **Career Readiness Indicator (CRI)** | **In Demand Occupations** |
| 17106G1002 | Alternating Current | • Alabama Certified Employee (ACE)<br>• Electrical Helper – Skills for Success<br>• Electronics Technicians Association – Basic AC<br>• Electronics Technicians Association – Basic Analog<br>• Electronics Technicians Association – Basic DC<br>• Electronics Technicians Association – Basic Digital<br>• Electronics Technicians Association – Comprehensive<br>• Electronics Technicians Association – Student Electronics Technician<br>• Forklift Operator – Skills for Success<br>• Machine Operator – Skills for Success<br>• MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)<br>• NCCER Core (module 6 is an elective and is not required for CRI)<br>• NCCER Electronic Systems Technician, Electronics<br>• Operator Technician – Skills for Success | • Electrical, Electronic, & Electromechanical Assemblers, Except Coil Winders, Tapers, & Finishers<br>• Electronics Engineering Technician<br>• Electronics Installer<br>• Electronics Repair Technician |
| 13997G1003 | Career Pathway Project in Manufacturing | | |
| 13997G1001 | CTE Lab in Manufacturing | | |
| 17104G1003 | Digital Electronics | | |
| 17106G1001 | Direct Current | | |
| 20101G1033 | Electronics and Control Systems | | |
| 21009G1005 | Embedded Arduino Controls | | |
| 13001G1000 | Introduction to Manufacturing | | |
| 21009G1001 | Introduction to Robotics | | |
| 21009G1002 | Robotics Applications | | |
| 17049G1000 | Safety and Health Regulations | | |
| 17106G1003 | Semiconductors | | |
| 17109G1000 | Telecommunications Cabling | | |

| Career Pathway Program | Industrial Maintenance Electrical & Instrumentation Program<br>**(Must teach three courses from this program list within two years)**<br>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, but 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 aligns with NCCER standards and covers topics such as Fasteners and Anchors, Process Mathematics, Pneumatic Controls, Oxyfuel Cutting, Introduction to Piping Components, and Laser Alignment. | | |
|---|---|---|---|
| **Course Number** | **Career Pathway Program Courses** | **Career Readiness Indicator (CRI)** | **In Demand Occupations** |
| 13997G1003 | Career Pathway Project in Manufacturing | • Alabama Certified Employee (ACE)<br>• Electrical Helper – Skills for Success<br>• FANUC CERT – Handling Tool Operations and Programming<br>• Forklift Operator – Skills for Success<br>• Machine Operator – Skills for Success<br>• MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)<br>• NCCER Core (module 6 is an elective and is not required for CRI)<br>• NCCER Industrial Maintenance E&I Level 1<br>• Operator Technician – Skills for Success | • Industrial Maintenance Electrical Repair Technician<br>• Industrial Maintenance Instrumentation Repair Technician<br>• Miscellaneous Assemblers & Fabricators |
| 13997G1001 | CTE Lab in Manufacturing | | |
| 13303G1001 | Industrial Maintenance Electrical & Instrumentation I | | |
| 13303G1002 | Industrial Maintenance Electrical & Instrumentation II | | |
| 13303G1003 | Industrial Maintenance Electrical & Instrumentation III | | |
| 13001G1000 | Introduction to Manufacturing | | |
| 17049G1000 | Safety and Health Regulations | | |

| Career Pathway Program | Industrial Maintenance Mechanical Program<br>**(Must teach three courses from this program list within two years)**<br>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, but 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 aligns with NCCER standards and covers topics such as Fasteners and Anchors, Process Mathematics, Pneumatic Controls, Oxyfuel Cutting, Introduction to Piping Components, and Laser Alignment. | | |
|---|---|---|---|
| **Course Number** | **Career Pathway Program Courses** | **Career Readiness Indicator (CRI)** | **In Demand Occupations** |
| 13997G1003 | Career Pathway Project in Manufacturing | • Alabama Certified Employee (ACE)<br>• Electrical Helper – Skills for Success<br>• FANUC CERT – Handling Tool Operations and Programming<br>• Forklift Operator – Skills for Success<br>• Machine Operator – Skills for Success<br>• MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)<br>• NCCER Core (module 6 is an elective and is not required for CRI)<br>• NCCER Industrial Maintenance Mechanic Level 1<br>• Operator Technician – Skills for Success<br>• Plumbing Helper – Skills for Success | • First Line Supervisors of Mechanics, Installers and Repairers<br>• First Line Supervisors of Production and Operating Workers<br>• Industrial Maintenance Mechanical Repair Technician<br>• Maintenance and Repair Workers General<br>• Pipefitting Technician |
| 13997G1001 | CTE Lab in Manufacturing | | |
| 13303G1004 | Industrial Maintenance Mechanical I | | |
| 13303G1005 | Industrial Maintenance Mechanical II | | |
| 13303G1006 | Industrial Maintenance Mechanical III | | |
| 13001G1000 | Introduction to Manufacturing | | |
| 17049G1000 | Safety and Health Regulations | | |

| Career Pathway Program | Modern Manufacturing Program<br>**(Must teach three courses from this program list within two years)**<br>Modern Manufacturing is designed to prepare students for entry level positions in manufacturing. These courses align with MSSC and NCCER standards which include modular courses for: Safety, Quality, Production and Maintenance. | | |
|---|---|---|---|
| **Course Number** | **Career Pathway Program Courses** | **Career Readiness Indicator (CRI)** | **In Demand Occupations** |
| 13997G1003 | Career Pathway Project in Manufacturing | • Alabama Certified Employee (ACE)<br>• Electrical Helper – Skills for Success<br>• FANUC CERT – Handling Tool Operations and Programming<br>• Forklift Operator – Skills for Success<br>• MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)<br>• NCCER Core (module 6 is an elective and is not required for CRI)<br>• Operator Technician – Skills for Success<br>• Ready for Industry – Manufacturing | • First Line Supervisors of Production and Operating Workers<br>• Maintenance & Repair Workers, General<br>• Manufacturing Operations Manager<br>• Manufacturing Operations Technician<br>• Miscellaneous Assemblers & Fabricators |
| 13997G1001 | CTE Lab in Manufacturing | | |
| 13001G1000 | Introduction to Manufacturing | | |
| 13002G1013 | Manufacturing I: Safety | | |
| 13002G1023 | Manufacturing II: Quality | | |
| 13002G1033 | Manufacturing III: Production | | |
| 13002G1043 | Manufacturing IV: Maintenance | | |
| 17049G1000 | Safety and Health Regulations | | |

| Career Pathway Program | Modern Manufacturing Center of Excellence Program<br>**(Students must complete all four courses to earn a Career Readiness Indicator)**<br>Modern Manufacturing Center of Excellence is designed to prepare students for entry level positions in manufacturing. These courses align with ACE, OSHA 10, and SACA standards which include modular courses for: Employability Skills, Safety, Tool Management, and Principals in Manufacturing. | | |
|---|---|---|---|
| **Course Number** | **Career Pathway Program Courses** | **Career Readiness Indicator (CRI)** | **In Demand Occupations** |
| 22152G1002 | **Modern Manufacturing Center of Excellence 1** | • Alabama Certified Employee (ACE)<br>• Forklift Operator – Skills for Success | • First Line Supervisors of Production and Operating Workers<br>• Maintenance & Repair Workers, General<br>• Manufacturing Operations Manager<br>• Manufacturing Operations Technician<br>• Miscellaneous Assemblers & Fabricators |
| 13002G1013 | Modern Manufacturing Center of Excellence 2 | | |
| 13002G1023 | Modern Manufacturing Center of Excellence 3 | | |
| 13997G1003 | Career Pathway Project in Manufacturing | | |
| 13997G1001 | CTE Lab in Manufacturing | | |
| *__NOTE__: LEAs must contact Mrs. Tiffany Poe at West Alabama Works, tiffany@learnmanufacturing.com, for additional information prior to utilizing any of the course codes listed above, as it does require commitment to the conditions in a MOU and participation in mandatory training provided by the provider. | | | |

| Career Pathway Program | Precision Machining Program<br>**(Must teach three courses from this program list within two years)**<br>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. | | |
|---|---|---|---|
| **Course Number** | **Career Pathway Program Courses** | **Career Readiness Indicator (CRI)** | **In Demand Occupations** |
| 13997G1003 | Career Pathway Project in Manufacturing | • Alabama Certified Employee (ACE)<br>• Autodesk – Fusion 360 Certified User<br>• Forklift Operator – Skills for Success<br>• Machine Operator – Skills for Success<br>• MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)<br>• NIMS Level 1 CNC Milling: Programming Setup and Operations<br>• NIMS Level 1 CNC Turning: Programming Setup and Operations<br>• NIMS Level 1 Drill Press Skills<br>• NIMS Level 1 Grinding Skills<br>• NIMS Level 1 Job Planning, Benchwork and Layout<br>• NIMS Level 1 Manual Milling Skills<br>• NIMS Level 1 Measurement, Materials and Safety<br>• NIMS Level 1 Milling Operations<br>• NIMS Level 1 Turning: Operations<br>• NIMS Level 1 Turning Operations: Turning Between Centers<br>• NIMS Level 1 Turning Operations: Turning Chucking Skills<br>• Operator Technician – Skills for Success | • CNC Machinist<br>• Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders<br>• Furnace, Kiln, Oven, Drier, & Kettle Operators & Tenders<br>• Industrial Machinery Mechanics<br>• Maintenance Workers, Machinery<br>• Mixing and Blending Machine Setters, Operators and Tenders<br>• Molding, Coremaking, and Casting Machine Setters, Cutting, Operators and Tenders, Metal and Plastic<br>• Packaging and Feeling Machine Operators and Tenders<br>• Precision Machinist |
| 13203G1004 | Computer-Aided Design and Computer-Aided Manufacturing I | | |
| 13203G1005 | Computer-Aided Design and Computer-Aided Manufacturing II | | |
| 13203G1006 | Computer Numerical Control (CNC) I | | |
| 13203G1007 | Computer Numerical Control (CNC) II | | |
| 13204G1001 | Coordinate Measuring Machine | | |
| 13997G1001 | CTE Lab in Manufacturing | | |
| 13204G1006 | Drill Press | | |
| 13204G1004 | Intermediate Lathe and Bench Work | | |
| 13204G1002 | Introduction to Lathe | | |
| 13001G1000 | Introduction to Manufacturing | | |
| 13203G1001 | Introduction to Precision Machining | | |
| 13203G1008 | Milling and Surface Grinder I | | |
| 13203G1009 | Milling and Surface Grinder II | | |
| 17049G1000 | Safety and Health Regulations | | |

| Career Pathway Program | Robotics and Automated Manufacturing Program<br>**(Must teach three courses from this program list within two years)**<br>The Robotics and Automated Manufacturing program covers a variety of topics including Computer Automation, Design, and Production, as well as Introduction to Robotics, Robotics Application, Electronics and Control Systems. Students will be prepared to earn entry level credentials recognized by the Electronics Technicians Association (ETA), MSSC, and NCCER. | | |
|---|---|---|---|
| **Course Number** | **Career Pathway Program Courses** | **Career Readiness Indicator (CRI)** | **In Demand Occupations** |
| 13997G1003 | Career Pathway Project in Manufacturing | • Alabama Certified Employee (ACE)<br>• Autodesk – AutoCAD Certified User<br>• Autodesk – Inventor Certified User<br>• Electrical Helper – Skills for Success<br>• Electronics Technicians Association – Basic AC<br>• Electronics Technicians Association – Basic Analog<br>• Electronics Technicians Association – Basic DC<br>• Electronics Technicians Association – Basic Digital<br>• Electronics Technicians Association – Comprehensive<br>• Electronics Technicians Association – Student Electronics Technician<br>• Forklift Operator – Skills for Success<br>• Machine Operator – Skills for Success<br>• MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)<br>• NCCER Core (module 6 is an elective and is not required for CRI)<br>• NCCER Electronic Systems Technician, Electronics<br>• Operator Technician – Skills for Success<br>• Solid Edge Certified Associate<br>• SolidWorks Associate | • Automation Technician<br>• Controls Engineer<br>• Electronic Technician<br>• Industrial Maintenance<br>• Programmable Logic Controller Technician<br>• Woodworking Machine Setters, Operators, & Tenders, Except Sawing |
| 13997G1001 | CTE Lab in Manufacturing | | |
| 21010G1001 | Computer Integrated Automation | | |
| 21010G1002 | Computer Integrated Design | | |
| 21010G1003 | Computer Integrated Production | | |
| 20101G1033 | Electronics and Control Systems | | |
| 13001G1000 | Introduction to Manufacturing | | |
| 21009G1001 | Introduction to Robotics | | |
| 21009G1002 | Robotics Application | | |
| 21010G1004 | Robotics and Automation | | |
| 17049G1000 | Safety and Health Regulations | | |

| Career Pathway Program | *SREB AC Automated Materials Joining Technology<br>**(Must teach three courses from this program list within two years.)**<br>Automated Materials Joining Technology allows students to use a project-based learning approach. Students will explore materials joining and forming methods, computer-aided design and automated systems that transform design concepts into fully developed products. Materials become more complex in chemical composition and structure, and the usefulness of many new materials is dependent upon improvements in joining science and technology. | | |
|---|---|---|---|
| **Course Number** | **Career Pathway Program Courses** | **Career Readiness Indicator (CRI)** | **In Demand Occupations** |
| 13997G1003 | Career Pathway Project in Manufacturing | • Alabama Certified Employee (ACE)<br>• Forklift Operator – Skills for Success<br>• Machine Operator – Skills for Success<br>• MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)<br>• NCCER Core (module 6 is an elective and is not required for CRI)<br>• Operator Technician – Skills for Success | • PLC Automation Technician<br>• Process Controls Engineer |
| 13997G1001 | CTE Lab in Manufacturing | | |
| 17049G1000 | Safety and Health Regulations | | |
| 13104G1013 | SREB Advanced Concepts in Materials Joining | | |
| 13104G1012 | SREB Applications in Automated Materials Joining | | |
| 13104G1011 | SREB Introduction to Automated Materials Joining | | |
| 13104G1014 | SREB Projects in Automated Materials Joining | | |
| ***NOTE:** LEAs must contact SREB for additional information prior to utilizing any of the course codes listed above, as it does require commitment to the conditions in a MOU and participation in mandatory training provided by the provider. | | | |

| Career Pathway Program | *SREB AC Energy and Power Program<br>(Must teach three courses from this program list within two years)<br>Energy and Power program allows students to understand various means of power generation and distribution with topics that include turbines, motor/generator sets, renewable and non-renewable energy generation, and electrochemical systems. Students will also gain knowledge and skills about single and multiple phase generation and distribution systems, transformers, and high voltage AC and DC systems. | | |
|---|---|---|---|
| **Course Number** | **Career Pathway Program Courses** | **Career Readiness Indicator (CRI)** | **In Demand Occupations** |
| 13997G1003 | Career Pathway Project in Manufacturing | • Alabama Certified Employee (ACE)<br>• Autodesk – AutoCAD Certified User<br>• Autodesk – Fusion 360 Certified User<br>• Autodesk – Inventor Certified User<br>• Machine Operator – Skills for Success<br>• NCCER Core (module 6 is an elective and is not required for CRI)<br>• Operator Technician – Skills for Success<br>• Solid Edge Certified Associate<br>• SolidWorks Associate | • Civil Engineer<br>• Electrical Engineer<br>• Environmental Scientist/Specialist<br>• Project Engineer |
| 13997G1001 | CTE Lab in Manufacturing | | |
| 17049G1000 | Safety and Health Regulations | | |
| 21049G1000 | SREB Advanced Science and Engineered Systems | | |
| 21049G1025 | SREB Electronics and Control Systems | | |
| 20101G1013 | SREB Energy and Power Foundations | | |
| 20101G1023 | SREB Energy Transmission and Distribution | | |
| ***NOTE:** LEAs must contact SREB for additional information prior to utilizing any of the course codes listed above, as it does require commitment to the conditions in a MOU and participation in mandatory training provided by the provider. | | | |

| Career Pathway Program | *SREB AC Integrated Production Technologies Program<br>(Must teach three courses from this program list within two years.)<br>Integrated Production Technologies allows students to apply what they learn in physics, chemistry and biology to real-world projects using emerging, cutting-edge materials. Students will work on the frontiers of product development by applying nanotechnology to new areas of need. Students will reengineer existing products to reduce the energy and material costs required to produce them, invent new products, and create more durable and efficient products using automated computer-aided design and manufacturing programs. | | |
|---|---|---|---|
| **Course Number** | **Career Pathway Program Courses** | **Career Readiness Indicator (CRI)** | **In Demand Occupations** |
| 13997G1003 | Career Pathway Project in Manufacturing | • Alabama Certified Employee (ACE)<br>• FANUC CERT – Handling Tool Operations and Programming<br>• Forklift Operator – Skills for Success<br>• Machine Operator – Skills for Success<br>• MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)<br>• NCCER Core (module 6 is an elective and is not required for CRI)<br>• Operator Technician – Skills for Success | • Manufacturing Operations Manager<br>• Manufacturing Operations Technician |
| 13997G1001 | CTE Lab in Manufacturing | | |
| 17049G1000 | Safety and Health Regulations | | |
| 13104G1001 | SREB Advanced Technology for Design and Production | | |
| 13104G1004 | SREB Design for the Production of Advanced Products | | |
| 13104G1003 | SREB Mechatronic Systems for Advanced Production | | |
| 13104G1002 | SREB Systems of Advanced Technology | | |
| ***NOTE:** LEAs must contact SREB for additional information prior to utilizing any of the course codes listed above, as it does require commitment to the conditions in a MOU and participation in mandatory training provided by the provider. | | | |

# 2025-2026 Subject and Personnel Codes
## Manufacturing Cluster

| Manufacturing Cluster Courses | | | |
|---|---|---|---|
| **Course Number** | **Course Name** | **Course Number** | **Course Name** |
| 21106G1033 | Advanced Drafting Design | 13001G1000 | Introduction to Manufacturing |
| 17106G1002 | Alternating Current | 13203G1001 | Introduction to Precision Machining |
| 13997G1003 | Career Pathway Project in Manufacturing | 21009G1001 | Introduction to Robotics |
| 13203G1004 | Computer-Aided Design and Computer-Aided Manufacturing I | 13002G1013 | Manufacturing I: Safety |
| 13203G1005 | Computer-Aided Design and Computer-Aided Manufacturing II | 13002G1023 | Manufacturing II: Quality |
| 21010G1001 | Computer Integrated Automation | 13002G1033 | Manufacturing III: Production |
| 21010G1002 | Computer Integrated Design | 13002G1043 | Manufacturing IV: Maintenance |
| 21010G1003 | Computer Integrated Production | 13203G1008 | Milling and Surface Grinder I |
| 13203G1006 | Computer Numerical Control (CNC) I | 13203G1009 | Milling and Surface Grinder II |
| 13203G1007 | Computer Numerical Control (CNC) II | 21010G1004 | Robotics and Automation |
| 13204G1001 | Coordinate Measuring Machine | 21009G1002 | Robotics Applications |
| 13997G1001 | CTE Lab in Manufacturing | 17049G1000 | Safety and Health Regulations |
| 17104G1003 | Digital Electronics | 17106G1003 | Semiconductors |
| | | 13104G1013 | SREB Advanced Concepts in Materials Joining |
| 20101G1033 | Electronics and Control Systems | 21049G1000 | SREB Advanced Science and Engineered Systems |
| | | 13104G1001 | SREB Advanced Technology for Design and Production |
| 21009G1005 | Embedded Arduino Controls | 13104G1012 | SREB Applications in Automated Materials Joining |
| 21002G1001 | Engineering Design Applications | 13104G1004 | SREB Design for the Production of Advanced Products |
| 13303G1001 | Industrial Maintenance Electrical & Instrumentation I | 21049G1025 | SREB Electronics and Control Systems |
| 13303G1002 | Industrial Maintenance Electrical & Instrumentation II | 20101G1013 | SREB Energy and Power Foundations |
| 13303G1003 | Industrial Maintenance Electrical & Instrumentation III | 20101G1023 | SREB Energy Transmission and Distribution |
| 13303G1004 | Industrial Maintenance Mechanical I | 13104G1011 | SREB Introduction to Automated Materials Joining |
| 13303G1005 | Industrial Maintenance Mechanical II | 13104G1003 | SREB Mechatronic Systems for Advanced Production |
| 13303G1006 | Industrial Maintenance Mechanical III | 13104G1014 | SREB Projects in Automated Materials Joining |
| 21106G1023 | Intermediate Drafting Design | 13104G1002 | SREB Systems of Advanced Technology |
| 13204G1004 | Intermediate Lathe and Bench Work | 17109G1000 | Telecommunications Cabling |
| 21106G1013 | Introduction to Drafting Design | 21107G1012 | Three-Dimensional Solid Modeling I |
| 21004G1001 | Introduction to Engineering Design | 21107G1022 | Three-Dimensional Solid Modeling II |
| 13204G1002 | Introduction to Lathe | | |

| Shared Courses | | | |
|---|---|---|---|
| **Course Number** | **Course Name** | **Cluster(s)** | **Required Year to Implement COS** |
| 17049G1000 | Safety and Health Regulations | Architecture and Construction<br>Health Science<br>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.alabamaachieves.org/career-and-technical-education/cte-courses-of-study/.

# College and Career Readiness Indicator Course Matrix

| Program Name | Additive Manufacturing | Electronics | Industrial Maintenance Electrical & Instrumentation | Industrial Maintenance Mechanical | Modern Manufacturing | Modern Manufacturing Center of Excellence |
|---|---|---|---|---|---|---|
| **Foundation Course(s)** | Introduction to Manufacturing<br>Safety and Health Regulations | Introduction to Manufacturing<br>Safety and Health Regulations | Introduction to Manufacturing<br>Safety and Health Regulations | Introduction to Manufacturing<br>Safety and Health Regulations | Introduction to Manufacturing<br>Safety and Health Regulations | Modern Manufacturing Center of Excellence: 1 |
| **Concentrator Course(s)** | Advanced Drafting Design<br>Engineering Design Applications<br>Intermediate Drafting Design<br>Introduction to Drafting Design<br>Introduction to Engineering Design<br>Three-Dimensional Solid Modeling I<br>Three-Dimensional Solid Modeling II | Alternating Current<br>Digital Electronics<br>Direct Current<br>Electronics and Control Systems<br>Embedded Arduino Controls<br>Introduction to Robotics<br>Robotics Applications<br>Semiconductors<br>Telecommunications Cabling | Industrial Maintenance Electrical & Instrumentation I<br>Industrial Maintenance Electrical & Instrumentation II<br>Industrial Maintenance Electrical & Instrumentation III | Industrial Maintenance Mechanical I<br>Industrial Maintenance Mechanical II<br>Industrial Maintenance Mechanical III | Manufacturing I: Safety<br>Manufacturing II: Quality<br>Manufacturing III: Production<br>Manufacturing IV: Maintenance | Modern Manufacturing Center of Excellence: 2<br>Modern Manufacturing Center of Excellence: 3 |
| **Capstone Course(s)** | Career Pathway Project in Manufacturing<br>CTE Lab in Manufacturing | Career Pathway Project in Manufacturing<br>CTE Lab in Manufacturing | Career Pathway Project in Manufacturing<br>CTE Lab in Manufacturing | Career Pathway Project in Manufacturing<br>CTE Lab in Manufacturing | Career Pathway Project in Manufacturing<br>CTE Lab in Manufacturing | Career Pathway Project in Manufacturing<br>CTE Lab in Manufacturing |

| Program Name | Precision Machining | Robotics and Automated Manufacturing | SREB AC Automated Materials Joining Technology | SREB AC Energy and Power | SREB AC Integrated Production Technologies |
|---|---|---|---|---|---|
| **Foundation Course(s)** | Introduction to Manufacturing<br>Safety and Health Regulations | Introduction to Manufacturing<br>Safety and Health Regulations | Safety and Health Regulations | Safety and Health Regulations | Safety and Health Regulations |
| **Concentrator Course(s)** | Computer-Aided Design and Computer-Aided Manufacturing I<br>Computer-Aided Design and Computer-Aided Manufacturing II<br>Computer Numerical Control (CNC) I<br>Computer Numerical Control (CNC) II<br>Coordinate Measuring Machine<br>Drill Press<br>Intermediate Lathe and Bench Work<br>Introduction to Lathe<br>Introduction to Precision Machining<br>Milling and Surface Grinder I<br>Milling and Surface Grinder II | Computer Integrated Automation<br>Computer Integrated Design<br>Computer Integrated Production<br>Electronics and Control Systems<br>Introduction to Robotics<br>Robotics Application<br>Robotics and Automation | SREB Advanced Concepts in Materials Joining<br>SREB Applications in Automated Materials Joining<br>SREB Introduction to Automated Materials Joining<br>SREB Projects in Automated Materials Joining | SREB Clean Energy Application<br>SREB Clean Energy Innovation<br>SREB Clean Energy Strategies<br>SREB Clean Energy Systems | SREB Advanced Technology for Design and Production<br>SREB Design for the Production of Advanced Products<br>SREB Mechatronic Systems for Advanced Production<br>SREB Systems of Advanced Technology |
| **Capstone Course(s)** | Career Pathway Project in Manufacturing<br>CTE Lab in Manufacturing | Career Pathway Project in Manufacturing<br>CTE Lab in Manufacturing | Career Pathway Project in Manufacturing<br>CTE Lab in Manufacturing | Career Pathway Project in Manufacturing<br>CTE Lab in Manufacturing | Career Pathway Project in Manufacturing<br>CTE Lab in Manufacturing |

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

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

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