# 2024 - 2025

## **PROGRAM GUIDE FOR:**

# **MANUFACTURING CLUSTER**



ALABAMA STATE DEPARTMENT OF EDUCATION CAREER AND TECHNICAL EDUCATION LISA BRUCE, EDUCATION ADMINISTRATOR TRIPP MARSHALL, EDUCATION SPECIALIST ASHLEY CRUM, ADMINISTRATIVE ASSISTANT (334) 694-4746

#### **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 night	gned in yenow are shared with other clusters. See Shared Courses table on page 5 for additional details.				
	Addit	tive Manufacturing Program			
Career	(Must teach three cours	es from this program list within two y	ears)		
Pathway	Additive Manufacturing is based upon Computer-Aided-De	esign and 3-D Printing. This program provides	students with the knowledge of Introduction,		
Program	Intermediate, and Advanced Drafting Design Technology, Three-Dimensional Solid Modeling and Engineering Applications and the sl successful in the Mechanical and Technical Design fields.				
Course	Career Pathway Program Courses	Career Readiness Indicator (CRI)	In Demand Occupations		
Number	Career ratilway riogram Courses	Career Readiness indicator (CRI)	In Demand Occupations		
21106G1033	Advanced Drafting Design	Alabama Certified Employee (ACE)	CAD Designer		
13997G1003	Career Pathway Project in Manufacturing	Autodesk – AutoCAD Certified User	<ul> <li>Mechanical Designer</li> </ul>		
13997G1001	CTE Lab in Manufacturing	<ul> <li>Autodesk – Fusion 360 Certified User</li> </ul>	Technical Designer		
21002G1001	Engineering Design Applications	<ul> <li>Autodesk – Inventor Certified User</li> </ul>			
21106G1023	Intermediate Drafting Design	<ul> <li>Solid Edge Certified Associate</li> </ul>			
21106G1013	Introduction to Drafting Design	SolidWorks Associate			
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				
		Electronics Program			

	Electronics r logram				
Career Pathway Program	(Must teach three courses from this program list within two years) The electronics program covers a variety of topics including Electrical Theory; Electronic Components; Soldering-Desoldering and Tools; J Diagrams-Schematics-Wiring Diagrams; Cabling; Power Supplies; Test Equipment and Measurements; Safety Precautions; Mathematic 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 Proceed 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)	<ul> <li>Electronics Engineering Technician</li> </ul>		
13997G1003	Career Pathway Project in Manufacturing	• Electronics Technicians Association –	Electronics Installer		
13997G1001	CTE Lab in Manufacturing	Basic AC	<ul> <li>Electronics Repair Technician</li> </ul>		
17104G1003	Digital Electronics	• Electronics Technicians Association -	• Electrical, Electronic, &		
17106G1001	Direct Current	Basic Analog	Electromechanical Assemblers		
20101G1033	Electronics and Control Systems	• Electronics Technicians Association -	(Except Coil Winders, Tapers, &		
21009G1005	Embedded Arduino Controls	Basic DC	Finishers)		
13001G1000	Introduction to Manufacturing	• Electronics Technicians Association -			
21009G1001	Introduction to Robotics	Basic Digital			
21009G1002	Robotics Applications	• Electronics Technicians Association -			
17049G1000	Safety and Health Regulations	Comprehensive			
17106G1003	Semiconductors	• Electronics Technicians Association -			
17109G1000	Telecommunications Cabling	Student Electronics Technician			
		<ul> <li>MSSC – Certified Production</li> </ul>			
		Technician (CPT) (Each module will count as a CRI)			

Electronics

NCCER Core (module 6 is an elective and is not required for CRI)
NCCER Electronic Systems Technician,

#### Industrial Maintenance Electrical & Instrumentation Program

Career Pathway Program

(Must teach three courses from this program list within two years)
 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)	<ul> <li>Industrial Maintenance Electrical</li> </ul>
13997G1001	CTE Lab in Manufacturing	<ul> <li>FANUC CERT – Handling Tool</li> </ul>	Repair Technician
13303G1001	Industrial Maintenance Electrical & Instrumentation I	Operations and Programming	<ul> <li>Industrial Maintenance</li> </ul>
13303G1002	Industrial Maintenance Electrical & Instrumentation II	<ul> <li>MSSC – Certified Production</li> </ul>	Instrumentation Repair Technician
13303G1003	Industrial Maintenance Electrical & Instrumentation III	Technician (CPT) (Each module will	<ul> <li>Miscellaneous Assemblers &amp;</li> </ul>
13001G1000	Introduction to Manufacturing	count as a CRI)	Fabricators
17049G1000	Safety and Health Regulations	• NCCER Core (module 6 is an elective and is not required for CRI)	
		<ul> <li>NCCER Industrial Maintenance E&amp;I</li> </ul>	
		Level 1	

#### Industrial Maintenance Mechanical Program

Career<br/>Pathway<br/>ProgramIndustrial maintenance is divided into two distinct pathways, electrical and instrumentation and mechanical. Industrial maintenance technicians<br/>are needed in every industry that uses machinery, from automotive assembly plants to computer manufacturers. Not only do they repair and<br/>maintain electrical instruments and equipment, but they also install and dismantle them. Every time a new appliance leaves a factory, or a new car<br/>rolls off the line, a skilled industrial maintenance technician played a role in producing it. This program aligns with NCCER standards and covers<br/>topics such as Fasteners and Anchors, Process Mathematics, Pneumatic Controls, Oxyfuel Cutting, Introduction to Piping Components, and Laser<br/>Alignment.Course<br/>NumberCareer Pathway Program CoursesCareer Readiness Indicator (CRI)In Demand Occupations

Number			· · · · · · · · · · · · · · · · · · ·
13997G1003	Career Pathway Project in Manufacturing	Alabama Certified Employee (ACE)	<ul> <li>Industrial Maintenance Mechanical</li> </ul>
13997G1001	CTE Lab in Manufacturing	<ul> <li>FANUC CERT – Handling Tool</li> </ul>	Repair Technician
13303G1004	Industrial Maintenance Mechanical I	Operations and Programming	Pipefitting Technician
13303G1005	Industrial Maintenance Mechanical II	MSSC – Certified Production     Technician (CPT) (Feeh module will	
13303G1006	Industrial Maintenance Mechanical III	Technician (CPT) (Each module will count as a CRI)	
13001G1000	Introduction to Manufacturing	• NCCER Core (module 6 is an elective	
17049G1000	Safety and Health Regulations	and is not required for CRI)	
		<ul> <li>NCCER Industrial Maintenance</li> </ul>	
		Mechanic Level 1	

Career Pathway Program	Modern Manufacturing Program (Must teach three courses from this program list within two years) Modern Manufacturing is designed to prepare students for entry level positions in manufacturing. These courses align with MSSC and NCC 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 13997G1001 13001G1000 13002G1013 13002G1023 13002G1033 13002G1043 17049G1000	Career Pathway Project in Manufacturing CTE Lab in Manufacturing Introduction to Manufacturing Manufacturing I: Safety Manufacturing II: Quality Manufacturing III: Production Manufacturing IV: Maintenance Safety and Health Regulations	<ul> <li>Alabama Certified Employee (ACE)</li> <li>FANUC CERT – Handling Tool Operations and Programming</li> <li>MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NCCER Core (module 6 is an elective and is not required for CRI)</li> </ul>	<ul> <li>Maintenance &amp; Repair Workers, General</li> <li>Manufacturing Operations Manager</li> <li>Manufacturing Operations Technician</li> <li>Miscellaneous Assemblers &amp; Fabricators</li> </ul>		

Career Pathway Program			adiness Indicator) manufacturing. These courses align with
Course Number	Career Pathway Program Courses	Career Readiness Indicator (CRI)	In Demand Occupations
22152G1002	Workforce Readiness – Required Foundation Course	Alabama Certified Employee (ACE)	• Maintenance & Repair Workers, General
13002G1013	Manufacturing I: Safety	• MSSC – Certified Production	<ul> <li>Manufacturing Operations Manager</li> </ul>
13002G1023	Manufacturing II: Quality	Technician (CPT) (Each module will count as a CRI)	<ul> <li>Manufacturing Operations Technician</li> </ul>
13002G1033	Manufacturing III: Production	<ul> <li>NCCER Core (module 6 is an elective and is not required for CRI)</li> </ul>	Miscellaneous Assemblers & Fabricators
	nust contact Mrs. Tiffany Poe at West Alabama Works, <u>tiffa</u> ed above, as it does require commitment to the conditions in		

13997G1003       Career Pathway Project in Manufacturing          • Alabama Certified Employee (ACE)         • CNC Machinist	ist within two years) In parts and instruments. The precision machining curriculum ments. dicator (CRI) In Demand Occupations ployee (ACE) tuction th module will • CNC Machinist • Maintenance Workers, Machinery • Precision Machinist illing: d Operations ess Skills g Skills mning, t Milling Skills ement, Materials Operations:	<ul> <li>rses from this program list within two yethine tools to produce precision parts and instruments.</li> <li>Career Readiness Indicator (CRI) <ul> <li>Alabama Certified Employee (ACE)</li> <li>MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NIMS Level 1 CNC Milling: Programming Setup and Operations</li> <li>NIMS Level 1 CNC Turning: Programming Setup and Operations</li> <li>NIMS Level 1 Drill Press Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul> </li> </ul>	(Must teach three cou Precision machinists set up and operate a variety of mac includes necessary skills for students to fabricate, modif Career Pathway Project in Manufacturing Computer-Aided Design and Computer-Aided Manufacturing I Computer-Aided Design and Computer-Aided Manufacturing II Computer Numerical Control (CNC) I Computer Numerical Control (CNC) II Coordinate Measuring Machine CTE Lab in Manufacturing Drill Press Intermediate Lathe and Bench Work Introduction to Lathe	Pathway Program           Course Number           13997G1003           13203G1004           13203G1005           13203G1006           13203G1007           13204G1001           13204G1006           13204G1006           13204G1006           13204G1006
Program       Precision machinists set up and operate a variety of machine tools to produce precision parts and instruments. The precision machinin includes necessary skills for students to fabricate, modify, or repair mechanical instruments.         Course       Career Pathway Program Courses       Career Readiness Indicator (CRI)       In Demand Occup         13997G1003       Career Pathway Project in Manufacturing       • Alabama Certified Employee (ACE)       • CNC Machinist         13203G1004       Computer-Aided Design and Computer-Aided Manufacturing I       • Alabama Certified Production Technician (CPT) (Each module will count as a CRI)       • NIMS Level 1 CNC Milling: Programming Setup and Operations       • Precision Machinist         13203G1005       Computer Numerical Control (CNC) I       • NIMS Level 1 CNC Turning: Programming Setup and Operations       • NIMS Level 1 CNC Turning: Programming Setup and Operations       • NIMS Level 1 Drill Press Skills         13204G1004       Intermediate Lathe and Bench Work       • NIMS Level 1 Grinding Skills       • NIMS Level 1 Job Planning, Benchwork and Layout       • NIMS Level 1 Manual Milling Skills         13203G1000       Milling and Surface Grinder I       • NIMS Level 1 Milling Operations: Turning Between Centers       • NIMS Level 1 Turning Operations: Turning Chucking Skills	In parts and instruments. The precision machining curriculum ments.         dicator (CRI)       In Demand Occupations         ployee (ACE)       • CNC Machinist         duction       • Maintenance Workers, Machinery         ch module will       • Precision Machinist         lilling:       • Operations         g Skills       g Skills         mning, t       Milling Skills         Operations       • Operations         g Operations:       • Operations	<ul> <li>hine tools to produce precision parts and instrumry, or repair mechanical instruments.</li> <li>Career Readiness Indicator (CRI) <ul> <li>Alabama Certified Employee (ACE)</li> <li>MSSC - Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NIMS Level 1 CNC Milling: Programming Setup and Operations</li> <li>NIMS Level 1 CNC Turning: Programming Setup and Operations</li> <li>NIMS Level 1 Drill Press Skills</li> <li>NIMS Level 1 Grinding Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul> </li> </ul>	Precision machinists set up and operate a variety of mac includes necessary skills for students to fabricate, modif <b>Career Pathway Program Courses</b> Career Pathway Project in Manufacturing Computer-Aided Design and Computer-Aided Manufacturing I Computer-Aided Design and Computer-Aided Manufacturing I Computer Numerical Control (CNC) I Computer Numerical Control (CNC) I Computer Numerical Control (CNC) II Coordinate Measuring Machine CTE Lab in Manufacturing Drill Press Intermediate Lathe and Bench Work Introduction to Lathe	Program           Course           Number           13997G1003           13203G1004           13203G1005           13203G1006           13203G1007           13204G1001           13204G1006           13204G1006           13204G1006           13204G1006
110gramincludes necessary skills for students to fabricate, modify, or repair mechanical instruments.Course NumberCareer Pathway Program CoursesCareer Readiness Indicator (CRI)In Demand Occup13997G1003Career Pathway Project in Manufacturing• Alabama Certified Employee (ACE)• CNC Machinist13203G1004Computer-Aided Design and Computer-Aided Manufacturing I• MSSC - Certified Production Technician (CPT) (Each module will count as a CRI)• CNC Machinist13203G1005Computer Numerical Control (CNC) I Manufacturing I• NIMS Level 1 CNC Milling: Programming Setup and Operations• Precision Machinist13203G1006Computer Numerical Control (CNC) II 13204G1001• NIMS Level 1 CNC Turning: Programming Setup and Operations• NIMS Level 1 Drill Press13204G1004Intermediate Lathe and Bench Work• NIMS Level 1 Job Planning, Benchwork and Layout• NIMS Level 1 Job Planning, Benchwork and Layout13203G1009Milling and Surface Grinder I 13203G1009• NIMS Level 1 Milling Operations• NIMS Level 1 Milling Operations13203G1009Milling and Surface Grinder II 17049G1000• NIMS Level 1 Turning Operations: • NIMS Level 1 Turning Chucking Skills	Imments.       In Demand Occupations         dicator (CRI)       In Demand Occupations         ployee (ACE)       • CNC Machinist         duction       • Maintenance Workers, Machinery         the module will       • Precision Machinist         lilling:       • Operations         ad Operations       • Precision Machinist         g Skills       • Skills         mning,       t         Milling Skills       • Operations         g Operations       • Operations	<ul> <li>y, or repair mechanical instruments.</li> <li>Career Readiness Indicator (CRI)</li> <li>Alabama Certified Employee (ACE)</li> <li>MSSC - Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NIMS Level 1 CNC Milling: Programming Setup and Operations</li> <li>NIMS Level 1 CNC Turning: Programming Setup and Operations</li> <li>NIMS Level 1 Drill Press Skills</li> <li>NIMS Level 1 Grinding Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul>	includes necessary skills for students to fabricate, modif Career Pathway Program Courses Career Pathway Project in Manufacturing Computer-Aided Design and Computer-Aided Manufacturing I Computer-Aided Design and Computer-Aided Manufacturing II Computer Numerical Control (CNC) I Computer Numerical Control (CNC) II Coordinate Measuring Machine CTE Lab in Manufacturing Drill Press Intermediate Lathe and Bench Work Introduction to Lathe	Course           Number           13997G1003           13203G1004           13203G1005           13203G1006           13203G1007           13204G1001           13204G1006           13204G1006           13204G1006           13204G1006
Course NumberCareer Pathway Program CoursesCareer Readiness Indicator (CRI)In Demand Occup13997G1003Career Pathway Project in Manufacturing• Alabama Certified Employee (ACE)• CNC Machinist13203G1004Computer-Aided Design and Computer-Aided Manufacturing I• Missc - Certified Production Technician (CPT) (Each module will count as a CRI)• CNC Machinist13203G1005Computer Numerical Control (CNC) I• NIMS Level 1 CNC Milling: Programming Setup and Operations• Precision Machinist13203G1006Computer Numerical Control (CNC) II• NIMS Level 1 CNC Turning: Programming Setup and Operations• NIMS Level 1 Drill Press Skills13204G1006Drill Press• NIMS Level 1 Job Planning, Benchwork and Layout• NIMS Level 1 Mauufacturing13203G1009Introduction to Lathe• NIMS Level 1 Mauufalling Skills13203G1009Milling and Surface Grinder I• NIMS Level 1 Milling Operations13203G1000Safety and Health Regulations• NIMS Level 1 Turning Operations: Turning Betwen Centers• NIMS Level 1 Turning Operations: Turning Chucking Skills• NIMS Level 1 Turning Operations: Turning Chucking Skills	dicator (CRI)In Demand Occupationsployee (ACE) duction ch module will• CNC Machinist • Maintenance Workers, Machinery • Precision Machinistfilling: d Operations ess Skills g Skills nning, t Milling Skills ement, Materials• CNC Machinist • Maintenance Workers, Machinery • Precision Machinist	Career Readiness Indicator (CRI)           • Alabama Certified Employee (ACE)           • MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)           • NIMS Level 1 CNC Milling: Programming Setup and Operations           • NIMS Level 1 CNC Turning: Programming Setup and Operations           • NIMS Level 1 CNC Turning: Programming Setup and Operations           • NIMS Level 1 Drill Press Skills           • NIMS Level 1 Drill Press Skills           • NIMS Level 1 Job Planning, Benchwork and Layout           • NIMS Level 1 Manual Milling Skills           • NIMS Level 1 Measurement, Materials	Career Pathway Program Courses Career Pathway Project in Manufacturing Computer-Aided Design and Computer-Aided Manufacturing I Computer-Aided Design and Computer-Aided Manufacturing II Computer Numerical Control (CNC) I Computer Numerical Control (CNC) II Coordinate Measuring Machine CTE Lab in Manufacturing Drill Press Intermediate Lathe and Bench Work Introduction to Lathe	Number           13997G1003           13203G1004           13203G1005           13203G1006           13203G1007           13204G1001           13204G1006           13204G1006           13204G1006           13204G1006
13997G1003       Career Pathway Project in Manufacturing <ul> <li>Alabama Certified Employee (ACE)</li> <li>Manufacturing I</li> </ul> <ul> <li>Alabama Certified Employee (ACE)</li> <li>Manufacturing I</li> </ul> <ul> <li>Manufacturing I</li> <li>Staturing II</li> <li>Staturing III</li> <li>Staturing III<th><ul> <li>Maintenance Workers, Machinery</li> <li>Maintenance Workers, Machinery</li> <li>Precision Machinist</li> </ul></th><th><ul> <li>MSSC - Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NIMS Level 1 CNC Milling: Programming Setup and Operations</li> <li>NIMS Level 1 CNC Turning: Programming Setup and Operations</li> <li>NIMS Level 1 Drill Press Skills</li> <li>NIMS Level 1 Grinding Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul></th><th>Computer-Aided Design and Computer-Aided Manufacturing I Computer-Aided Design and Computer-Aided Manufacturing II Computer Numerical Control (CNC) I Computer Numerical Control (CNC) II Coordinate Measuring Machine CTE Lab in Manufacturing Drill Press Intermediate Lathe and Bench Work Introduction to Lathe</th><th>13997G1003 13203G1004 13203G1005 13203G1006 13203G1007 13204G1001 13997G1001 13204G1006 13204G1004</th></li></ul>	<ul> <li>Maintenance Workers, Machinery</li> <li>Maintenance Workers, Machinery</li> <li>Precision Machinist</li> </ul>	<ul> <li>MSSC - Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NIMS Level 1 CNC Milling: Programming Setup and Operations</li> <li>NIMS Level 1 CNC Turning: Programming Setup and Operations</li> <li>NIMS Level 1 Drill Press Skills</li> <li>NIMS Level 1 Grinding Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul>	Computer-Aided Design and Computer-Aided Manufacturing I Computer-Aided Design and Computer-Aided Manufacturing II Computer Numerical Control (CNC) I Computer Numerical Control (CNC) II Coordinate Measuring Machine CTE Lab in Manufacturing Drill Press Intermediate Lathe and Bench Work Introduction to Lathe	13997G1003 13203G1004 13203G1005 13203G1006 13203G1007 13204G1001 13997G1001 13204G1006 13204G1004
13203G1004       Computer-Aided Design and Computer-Aided Manufacturing I       • MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)       • Maintenance Workers, M         13203G1005       Computer-Aided Design and Computer-Aided Manufacturing II       • MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)       • Maintenance Workers, M         13203G1006       Computer Numerical Control (CNC) I       • NIMS Level 1 CNC Milling: Programming Setup and Operations       • NIMS Level 1 CNC Turning: Programming Setup and Operations         13204G1001       CTE Lab in Manufacturing       • NIMS Level 1 Drill Press S       • NIMS Level 1 Orill Press Skills         13204G1000       Introduction to Lathe       • NIMS Level 1 Manual Milling Skills       • NIMS Level 1 Manual Milling Skills         13203G1000       Introduction to Precision Machining       • NIMS Level 1 Measurement, Materials and Safety       • NIMS Level 1 Milling Operations: Turning Between Centers         17049G1000       Safety and Health Regulations       • NIMS Level 1 Turning Operations: Turning Chucking Skills	<ul> <li>Maintenance Workers, Machinery</li> <li>Maintenance Workers, Machinery</li> <li>Precision Machinist</li> </ul>	<ul> <li>MSSC - Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NIMS Level 1 CNC Milling: Programming Setup and Operations</li> <li>NIMS Level 1 CNC Turning: Programming Setup and Operations</li> <li>NIMS Level 1 Drill Press Skills</li> <li>NIMS Level 1 Grinding Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul>	Computer-Aided Design and Computer-Aided Manufacturing I Computer-Aided Design and Computer-Aided Manufacturing II Computer Numerical Control (CNC) I Computer Numerical Control (CNC) II Coordinate Measuring Machine CTE Lab in Manufacturing Drill Press Intermediate Lathe and Bench Work Introduction to Lathe	13203G1005 13203G1006 13203G1007 13204G1001 13997G1001 13204G1006 13204G1004
13203G1005Computer-Aided Design and Computer-Aided Manufacturing IIcount as a CRI)13203G1006Computer Numerical Control (CNC) INIMS Level 1 CNC Milling: Programming Setup and Operations13204G1001Coordinate Measuring MachineNIMS Level 1 CNC Turning: Programming Setup and Operations13204G1006Drill PressNIMS Level 1 Drill Press Skills13204G1006Drill PressNIMS Level 1 Drill Press Skills13204G1002Intermediate Lathe and Bench WorkNIMS Level 1 Job Planning, Benchwork and Layout13203G1001Introduction to ManufacturingNIMS Level 1 Manual Milling Skills13203G1001Introduction to Precision MachiningNIMS Level 1 Measurement, Materials and Safety13203G1000Milling and Surface Grinder IINIMS Level 1 Milling Operations: Turning Between Centers17049G1000Safety and Health RegulationsNIMS Level 1 Turning Operations: Turning Detween Centers	filling: ad Operations arming: ad Operations ess Skills g Skills nning, t Milling Skills ement, Materials Operations g Operations:	<ul> <li>count as a CRI)</li> <li>NIMS Level 1 CNC Milling: Programming Setup and Operations</li> <li>NIMS Level 1 CNC Turning: Programming Setup and Operations</li> <li>NIMS Level 1 Drill Press Skills</li> <li>NIMS Level 1 Grinding Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul>	Manufacturing II         Computer Numerical Control (CNC) I         Computer Numerical Control (CNC) II         Coordinate Measuring Machine         CTE Lab in Manufacturing         Drill Press         Intermediate Lathe and Bench Work         Introduction to Lathe	13203G1006 13203G1007 13204G1001 13997G1001 13204G1006 13204G1004
13203G1007Computer Numerical Control (CNC) II13203G1007Computer Numerical Control (CNC) II13204G1001Coordinate Measuring Machine13997G1001CTE Lab in Manufacturing13204G1006Drill Press13204G1004Intermediate Lathe and Bench Work13204G1002Introduction to Lathe13203G1000Introduction to Manufacturing13203G1001Introduction to Precision Machining13203G1008Milling and Surface Grinder I13203G1009Milling and Surface Grinder II17049G1000Safety and Health Regulations17049G1000Safety and Health Regulations	d Operations arming: d Operations ess Skills g Skills nning, t Milling Skills ement, Materials Operations g Operations:	<ul> <li>Programming Setup and Operations</li> <li>NIMS Level 1 CNC Turning: Programming Setup and Operations</li> <li>NIMS Level 1 Drill Press Skills</li> <li>NIMS Level 1 Grinding Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul>	Computer Numerical Control (CNC) II Coordinate Measuring Machine CTE Lab in Manufacturing Drill Press Intermediate Lathe and Bench Work Introduction to Lathe	13203G1007 13204G1001 13997G1001 13204G1006 13204G1004
13203G1007Computer Numerical Control (CNC) II13204G1001Coordinate Measuring Machine13997G1001CTE Lab in Manufacturing13204G1006Drill Press13204G1004Intermediate Lathe and Bench Work13204G1000Introduction to Lathe13001G1000Introduction to Manufacturing13203G1001Introduction to Precision Machining13203G1008Milling and Surface Grinder I13203G1009Milling and Surface Grinder II17049G1000Safety and Health Regulations17049G1000Safety and Health Regulations	urning: d Operations ess Skills g Skills nning, t Milling Skills ement, Materials Operations g Operations:	<ul> <li>NIMS Level 1 CNC Turning: Programming Setup and Operations</li> <li>NIMS Level 1 Drill Press Skills</li> <li>NIMS Level 1 Grinding Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul>	Coordinate Measuring Machine CTE Lab in Manufacturing Drill Press Intermediate Lathe and Bench Work Introduction to Lathe	13204G1001 13997G1001 13204G1006 13204G1004
13204G1001Coordinate Measuring Machine13997G1001CTE Lab in Manufacturing13204G1006Drill Press13204G1004Intermediate Lathe and Bench Work13204G1002Introduction to Lathe13204G1000Introduction to Manufacturing13203G1000Introduction to Precision Machining13203G1008Milling and Surface Grinder I13203G1009Milling and Surface Grinder II17049G1000Safety and Health Regulations17049G1000Safety and Health Regulations	d Operations ess Skills g Skills nning, t Milling Skills ement, Materials Operations g Operations:	<ul> <li>Programming Setup and Operations</li> <li>NIMS Level 1 Drill Press Skills</li> <li>NIMS Level 1 Grinding Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul>	CTE Lab in Manufacturing Drill Press Intermediate Lathe and Bench Work Introduction to Lathe	13997G1001 13204G1006 13204G1004
1399/01001CTE Lab in Malufacturing13204G1006Drill Press13204G1004Intermediate Lathe and Bench Work13204G1002Introduction to Lathe13204G1000Introduction to Lathe13203G1000Introduction to Manufacturing13203G1001Introduction to Precision Machining13203G1008Milling and Surface Grinder I13203G1009Milling and Surface Grinder II17049G1000Safety and Health Regulations17049G1000Safety and Health RegulationsNIMS Level 1 Turning Operations: Turning Between CentersNIMS Level 1 Turning Operations: Turning Chucking Skills	ess Skills g Skills nning, t Milling Skills ement, Materials Operations g Operations:	<ul> <li>NIMS Level 1 Drill Press Skills</li> <li>NIMS Level 1 Grinding Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul>	Drill Press Intermediate Lathe and Bench Work Introduction to Lathe	13204G1006 13204G1004
13204G1006Drill Press13204G1004Intermediate Lathe and Bench Work13204G1002Introduction to Lathe13001G1000Introduction to Manufacturing13203G1001Introduction to Precision Machining13203G1008Milling and Surface Grinder I13203G1009Milling and Surface Grinder II17049G1000Safety and Health Regulations17049G1000Safety and Health RegulationsNIMS Level 1 Turning Operations: Turning Between CentersNIMS Level 1 Turning Operations: Turning Chucking Skills	g Skills nning, t Milling Skills ement, Materials Operations g Operations:	<ul> <li>NIMS Level 1 Grinding Skills</li> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul>	Intermediate Lathe and Bench Work Introduction to Lathe	13204G1004
13204G1004       Internetiate Latie and Belefit 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         17049G1000       Safety and Health Regulations	nning, t Milling Skills ement, Materials Operations g Operations:	<ul> <li>NIMS Level 1 Job Planning, Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul>	Introduction to Lathe	
13204G1002       Introduction to Laine       Benchwork and Layout         13001G1000       Introduction to Manufacturing       NIMS Level 1 Manual Milling Skills         13203G1001       Introduction to Precision Machining       NIMS Level 1 Manual Milling Skills         13203G1008       Milling and Surface Grinder I       and Safety         13203G1009       Milling and Surface Grinder II       NIMS Level 1 Milling Operations         17049G1000       Safety and Health Regulations       NIMS Level 1 Turning Operations: Turning Between Centers         NIMS Level 1 Turning Operations: Turning Chucking Skills       NIMS Level 1 Turning Operations:	t Milling Skills ement, Materials Operations g Operations:	<ul> <li>Benchwork and Layout</li> <li>NIMS Level 1 Manual Milling Skills</li> <li>NIMS Level 1 Measurement, Materials</li> </ul>		13204G1002
1300101000       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         Image: State of the stat	Milling Skills ement, Materials Operations g Operations:	<ul> <li>• NIMS Level 1 Manual Milling Skills</li> <li>• NIMS Level 1 Measurement, Materials</li> </ul>	Introduction to Manufacturing	
13203G1008       Milling and Surface Grinder I         13203G1009       Milling and Surface Grinder II         17049G1000       Safety and Health Regulations         Indication of the closed of the clos	ement, Materials Operations g Operations:	NIMS Level 1 Measurement, Materials		13001G1000
13203G1008       Milling and Surface Grinder I       and Safety         13203G1009       Milling and Surface Grinder II       • NIMS Level 1 Milling Operations         17049G1000       Safety and Health Regulations       • NIMS Level 1 Milling Operations: Turning Between Centers         • NIMS Level 1 Turning Operations: Turning Chucking Skills       • NIMS Level 1 Turning Operations:	Operations operations:	· · · · · · · · · · · · · · · · · · ·	Introduction to Precision Machining	13203G1001
13203G1009       Milling and Surface Grinder II       • NIMS Level 1 Milling Operations         17049G1000       Safety and Health Regulations       • NIMS Level 1 Turning Operations: Turning Between Centers         • NIMS Level 1 Turning Operations: Turning Chucking Skills       • NIMS Level 1 Turning Operations:	g Operations:	and Safety		13203G1008
17049G1000       Safety and Health Regulations       • NIMS Level 1 Turning Operations: Turning Between Centers         • NIMS Level 1 Turning Operations: Turning Chucking Skills	g Operations:		Milling and Surface Grinder II	13203G1009
NINS Level 1 Turning Operations: Turning Between Centers     NIMS Level 1 Turning Operations: Turning Chucking Skills				
NIMS Level 1 Turning Operations: Turning Chucking Skills			Survey and Health Regulations	1/01/01000
Turning Chucking Skills				
NIMS Level 1 Turning: Operations				
	;: Operations	NIMS Level 1 Turning: Operations		
Dalating and Assessed of Manufacturing Dus system	stantin a Dus susat	J Antonio to J Monufo sturing Duo su	Dehetieren	
Robotics and Automated Manufacturing Program				~
Career (Must teach three courses from this program list within two years)				
Pathway The Robotics and Automated Manufacturing program covers a variety of topics including Computer Automation, Design, and Produc				v
Program Introduction to Robotics, Robotics Application, Electronics and Control Systems. Students will be prepared to earn entry level credent	lents will be prepared to earn entry level credentials recognized			Program
by the Electronics Technicians Association (ETA), MSSC, and NCCER.		C, and NCCER.	by the Electronics Technicians Association (ETA), MSS	
Course Number         Career Pathway Program Courses         Career Readiness Indicator (CRI)         In Demand Occup	dicator (CRI) In Demand Occupations	Career Readiness Indicator (CRI)	Career Pathway Program Courses	
13997G1003       Career Pathway Project in Manufacturing <ul> <li>Alabama Certified Employee (ACE)</li> <li>Automation Technician</li> </ul>	ployee (ACE) • Automation Technician	• Alabama Certified Employee (ACE)	Career Pathway Project in Manufacturing	
	Controls Engineer	Autodask AutoCAD Cartified User		
21010G1002 G + L + 1D +	8	Autodesk – AutoCAD Certified User		
	• Electronic Technician	Autodesk – Inventor Certified User	Computer Integrated Design	21010C÷1002
Dase AC Togrammable Logic Con	<ul> <li>ertified User</li> <li>Electronic Technician</li> <li>Industrial Maintenance</li> </ul>	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association –</li> </ul>	Computer Integrated Design	
	<ul> <li>Electronic Technician</li> <li>Electronic Technician</li> <li>Industrial Maintenance</li> <li>Programmable Logic Controller</li> </ul>	Autodesk – Inventor Certified User     Electronics Technicians Association –     Basic AC	Computer Integrated Production	21010G1003
	<ul> <li>Electronic Technician</li> <li>Electronic Technician</li> <li>Industrial Maintenance</li> <li>Programmable Logic Controller</li> </ul>	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association –</li> </ul>	Computer Integrated Production Electronics and Control Systems	21010G1003 20101G1033
21000C1002 D L C A L' C	<ul> <li>ertified User</li> <li>ertified User</li></ul>	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing	21010G1003 20101G1033 13001G1000
Dasie De	<ul> <li>ertified User</li> <li>is Association –</li> <li>industrial Maintenance</li> <li>Programmable Logic Controller Technician</li> </ul>	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association –</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics	21010G1003 20101G1033 13001G1000 21009G1001
	Pertified User       • Electronic Technician         Iss Association –       • Industrial Maintenance         Iss Association –       • Programmable Logic Controller         Iss Association –       • Electronic Technician	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002
	Pertified User       • Electronic Technician         Iss Association –       • Industrial Maintenance         Iss Association –       • Programmable Logic Controller         Iss Association –       • Electronic Technician	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association –</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000     Safety and Health Regulations     Basic Digital	Pertified User       • Electronic Technician         is Association –       • Industrial Maintenance         is Association –       • Programmable Logic Controller         is Association –       • Respective Controller         is Association –       • Sassociation –	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic DC</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000     Safety and Health Regulations     Basic Digital       • Electronics Technicians Association –	Pertified User       • Electronic Technician         Industrial Maintenance       • Industrial Maintenance         Industrial Maintenance       • Programmable Logic Controller         Ins Association –       Ins Association –         Ins Association –       Ins Association –	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association –</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000     Safety and Health Regulations     Basic Digital       • Electronics Technicians Association – Comprehensive	Pertified User       • Electronic Technician         Is Association –       • Industrial Maintenance         Is Association –       • Programmable Logic Controller         Is Association –       • Electronic Technician         Is Association –       • Industrial Maintenance         Is Association –       • Sassociation –         Is Association –       • Industrial Maintenance	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000     Safety and Health Regulations     Basic Digital       • Electronics Technicians Association – Comprehensive     • Electronics Technicians Association –	Pertified User       • Electronic Technician         Is Association –       • Industrial Maintenance         Is Association –       • Programmable Logic Controller         Is Association –       • Electronic Technician         Is Association –       • Industrial Maintenance         Is Association –       • Programmable Logic Controller         Is Association –       • Industrial Maintenance         Is Association –       • Industrial Maintenance         Is Association –       • Industrial Maintenance	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Comprehensive</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000     Safety and Health Regulations     Basic Digital       • Electronics Technicians Association – Comprehensive	Pertified User       • Electronic Technician         is Association –       • Industrial Maintenance         is Association –       • Programmable Logic Controller         is Association –       • Electronic Technician         is Association –       • Industrial Maintenance         is Association –       • Programmable Logic Controller         is Association –       • Industrial Maintenance         is Association –       • Industrial Maintenance         is Association –       • Industrial Maintenance	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association –</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000     Safety and Health Regulations     Basic Digital       • Electronics Technicians Association – Comprehensive     • Electronics Technicians Association –	Pertified User       • Electronic Technician         is Association –       • Industrial Maintenance         is Association –       • Programmable Logic Controller         is Association –       • Electronic Technician         is Association –       • Industrial Maintenance         is Association –       • Programmable Logic Controller         is Association –       • Industrial Maintenance	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Student Electronics Technician</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000       Safety and Health Regulations       Basic Digital         • Electronics Technicians Association – Comprehensive       • Electronics Technicians Association – Student Electronics Technician	Pertified User       • Electronic Technician         is Association –       • Industrial Maintenance         is Association –       • Programmable Logic Controller         is Association –       • Electronic Technician         is Association –       • Programmable Logic Controller         is Association –       • Industrial Maintenance         • I	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Student Electronics Technician</li> <li>MSSC – Certified Production</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000       Safety and Health Regulations       Basic Digital         Electronics Technicians Association – Comprehensive       Electronics Technicians Association – Student Electronics Technician         MSSC – Certified Production       MSSC – Certified Production	Pertified User       • Electronic Technician         is Association –       • Industrial Maintenance         is Association –       • Programmable Logic Controller         is Association –       • Electronic Technician         is Association –       • Programmable Logic Controller         is Association –       • Industrial Maintenance         • I	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Student Electronics Technician</li> <li>MSSC – Certified Production Technician (CPT) (Each module will</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000       Safety and Health Regulations       Basic Digital         Electronics Technicians Association – Comprehensive       Electronics Technicians Association – Student Electronics Technician         MSSC – Certified Production Technician (CPT) (Each module will       Technician (CPT) (Each module will	<ul> <li>Electronic Technician</li> <li>Industrial Maintenance</li> <li>Programmable Logic Controller Technician</li> <li>Association –</li> <li>Association –<!--</th--><td><ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Student Electronics Technician</li> <li>MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)</li> </ul></td><td>Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation</td><td>21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004</td></li></ul>	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Student Electronics Technician</li> <li>MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000       Safety and Health Regulations       Basic Digital         Electronics Technicians Association – Comprehensive       Electronics Technicians Association – Student Electronics Technician         MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)       MSSC – CRI	<ul> <li>etified User</li> <li>is Association –</li> <li>is a second for the second for the</li></ul>	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Student Electronics Technician</li> <li>MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NCCER Core (module 6 is an elective</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000       Safety and Health Regulations       Basic Digital         Electronics Technicians Association – Comprehensive       Electronics Technicians Association – Student Electronics Technician         MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)       NCCER Core (module 6 is an elective and is not required for CRI)	<ul> <li>Electronic Technician</li> <li>Industrial Maintenance</li> <li>Programmable Logic Controller Technician</li> <li>Association –</li> <li>Association –<!--</th--><td><ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Student Electronics Technician</li> <li>MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NCCER Core (module 6 is an elective and is not required for CRI)</li> </ul></td><td>Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation</td><td>21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004</td></li></ul>	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Student Electronics Technician</li> <li>MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NCCER Core (module 6 is an elective and is not required for CRI)</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000       Safety and Health Regulations       Basic Digital         Electronics Technicians Association – Comprehensive       Electronics Technicians Association – Student Electronics Technician         MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)       MSCCER Core (module 6 is an elective	<ul> <li>Electronic Technician</li> <li>Industrial Maintenance</li> <li>Programmable Logic Controller Technician</li> <li>Association –</li> <li>Association –<!--</th--><td><ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Student Electronics Technician</li> <li>MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NCCER Core (module 6 is an elective and is not required for CRI)</li> <li>NCCER Electronic Systems</li> </ul></td><td>Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation</td><td>21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004</td></li></ul>	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Student Electronics Technician</li> <li>MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NCCER Core (module 6 is an elective and is not required for CRI)</li> <li>NCCER Electronic Systems</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004
17049G1000       Safety and Health Regulations       Basic Digital         Basic Digital       Electronics Technicians Association – Comprehensive         Electronics Technicians Association – Student Electronics Technician         MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)         NCCER Core (module 6 is an elective and is not required for CRI)         NCCER Electronic Systems	<ul> <li>Electronic Technician</li> <li>Electronic Technician</li> <li>Industrial Maintenance</li> <li>Programmable Logic Controller Technician</li> <li>Association –</li> <li>Associa</li></ul>	<ul> <li>Autodesk – Inventor Certified User</li> <li>Electronics Technicians Association – Basic AC</li> <li>Electronics Technicians Association – Basic Analog</li> <li>Electronics Technicians Association – Basic DC</li> <li>Electronics Technicians Association – Basic Digital</li> <li>Electronics Technicians Association – Comprehensive</li> <li>Electronics Technicians Association – Student Electronics Technician</li> <li>MSSC – Certified Production Technician (CPT) (Each module will count as a CRI)</li> <li>NCCER Core (module 6 is an elective and is not required for CRI)</li> <li>NCCER Electronics Systems Technician, Electronics</li> </ul>	Computer Integrated Production Electronics and Control Systems Introduction to Manufacturing Introduction to Robotics Robotics Application Robotics and Automation	21010G1003 20101G1033 13001G1000 21009G1001 21009G1002 21010G1004

Career Pathway Program	*SREB AC Automated Materials Joining Technology (Must teach three courses from this program list within two years.) 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	<b>Career Pathway Program Courses</b>	Career Readiness Indicator (CRI)	In Demand Occupations				
13997G1003	Career Pathway Project in Manufacturing	Alabama Certified Employee (ACE)	Process Controls Engineer				
13997G1001	CTE Lab in Manufacturing	• MSSC – Certified Production Technician (CPT) (Each module will	PLC Automation Technician				
17049G1000	Safety and Health Regulations						
13104G1013	SREB Advanced Concepts in Materials Joining	count as a CRI)					
13104G1012	SREB Applications in Automated Materials Joining	• NCCER Core (module 6 is an					
13104G1011	SREB Introduction to Automated Materials Joining	elective and is not required for CRI)					
13104G1014	SREB Projects in Automated Materials Joining	1					
	s must contact SREB for additional information prior to	1					
	f the course codes listed above, as it does require						
commitment to	the conditions in a MOU and participation in mandatory						
commitment to training provid	the conditions in a MOU and participation in mandatory ed by the provider. *SREB (Must teach three c	AC Energy and Power Program ourses from this program list within t					
commitment to	the conditions in a MOU and participation in mandatory ed by the provider. *SREB	ourses from this program list within t various means of power generation and distri y generation, and electrochemical systems. So	ibution with topics that include turbines, tudents will also gain knowledge and skills				
commitment to training provid Career Pathway	the conditions in a MOU and participation in mandatory ed by the provider. *SREB (Must teach three c Energy and Power program allows students to understand motor/generator sets, renewable and non-renewable energ	ourses from this program list within t various means of power generation and distri y generation, and electrochemical systems. So	ibution with topics that include turbines, tudents will also gain knowledge and skills				
Career Pathway Program Course	the conditions in a MOU and participation in mandatory ed by the provider. *SREB (Must teach three c Energy and Power program allows students to understand motor/generator sets, renewable and non-renewable energ about single and multiple phase generation and distributio Career Pathway Program Courses Career Pathway Project in Manufacturing	ourses from this program list within tr various means of power generation and distri y generation, and electrochemical systems. St n systems, transformers, and high voltage AC	ibution with topics that include turbines, tudents will also gain knowledge and skills C and DC systems.				
Career Pathway Program Course Number	the conditions in a MOU and participation in mandatory ed by the provider. *SREB (Must teach three c Energy and Power program allows students to understand motor/generator sets, renewable and non-renewable energ about single and multiple phase generation and distributio Career Pathway Program Courses Career Pathway Project in Manufacturing CTE Lab in Manufacturing	ourses from this program list within t various means of power generation and distri y generation, and electrochemical systems. Su n systems, transformers, and high voltage AC Career Readiness Indicator (CRI)	ibution with topics that include turbines, tudents will also gain knowledge and skills c and DC systems. In Demand Occupations				
Career Pathway Program Course Number 13997G1003	the conditions in a MOU and participation in mandatory ed by the provider. *SREB (Must teach three c Energy and Power program allows students to understand motor/generator sets, renewable and non-renewable energ about single and multiple phase generation and distributio Career Pathway Program Courses Career Pathway Project in Manufacturing CTE Lab in Manufacturing Safety and Health Regulations	ourses from this program list within t         various means of power generation and distri         y generation, and electrochemical systems. St         n systems, transformers, and high voltage AC         Career Readiness Indicator (CRI)         • Alabama Certified Employee (ACE)         • Autodesk – AutoCAD Certified User         • Autodesk – Fusion 360 Certified User	<ul> <li>ibution with topics that include turbines, tudents will also gain knowledge and skills 2 and DC systems.</li> <li>In Demand Occupations         <ul> <li>Civil Engineer</li> <li>Electrical Engineer</li> <li>Environmental Scientist/Specialist</li> </ul> </li> </ul>				
Career Pathway Program Course Number 13997G1003 13997G1001 17049G1000 21049G1000	the conditions in a MOU and participation in mandatory ed by the provider. *SREB (Must teach three c Energy and Power program allows students to understand motor/generator sets, renewable and non-renewable energ about single and multiple phase generation and distributio Career Pathway Program Courses Career Pathway Project in Manufacturing CTE Lab in Manufacturing Safety and Health Regulations SREB Advanced Science and Engineered Systems	ourses from this program list within t various means of power generation and distri y generation, and electrochemical systems. St n systems, transformers, and high voltage AC Career Readiness Indicator (CRI) • Alabama Certified Employee (ACE) • Autodesk – AutoCAD Certified User • Autodesk – Fusion 360 Certified User • Autodesk – Inventor Certified User	<ul> <li>ibution with topics that include turbines, tudents will also gain knowledge and skills</li> <li>and DC systems.</li> <li>In Demand Occupations</li> <li>Civil Engineer</li> <li>Electrical Engineer</li> </ul>				
Career Pathway Program Course Number 13997G1003 13997G1001 17049G1000 21049G1000 21049G1002	the conditions in a MOU and participation in mandatory ed by the provider. *SREB (Must teach three c Energy and Power program allows students to understand motor/generator sets, renewable and non-renewable energ about single and multiple phase generation and distributio Career Pathway Program Courses Career Pathway Project in Manufacturing CTE Lab in Manufacturing Safety and Health Regulations SREB Advanced Science and Engineered Systems SREB Electronics and Control Systems	ourses from this program list within t         various means of power generation and distri         y generation, and electrochemical systems. St         n systems, transformers, and high voltage AC         Career Readiness Indicator (CRI)         • Alabama Certified Employee (ACE)         • Autodesk – AutoCAD Certified User         • Autodesk – Fusion 360 Certified User         • Autodesk – Inventor Certified User         • Solid Edge Certified Associate	<ul> <li>ibution with topics that include turbines, tudents will also gain knowledge and skills 2 and DC systems.</li> <li>In Demand Occupations         <ul> <li>Civil Engineer</li> <li>Electrical Engineer</li> <li>Environmental Scientist/Specialist</li> </ul> </li> </ul>				
Career Pathway Program Course Number 13997G1003 13997G1001 17049G1000 21049G1000 21049G1025 20101G1013	the conditions in a MOU and participation in mandatory ed by the provider. *SREB (Must teach three c Energy and Power program allows students to understand motor/generator sets, renewable and non-renewable energ about single and multiple phase generation and distributio Career Pathway Program Courses Career Pathway Project in Manufacturing CTE Lab in Manufacturing Safety and Health Regulations SREB Advanced Science and Engineered Systems SREB Electronics and Control Systems SREB Energy and Power Foundations	ourses from this program list within t various means of power generation and distri y generation, and electrochemical systems. St n systems, transformers, and high voltage AC Career Readiness Indicator (CRI) • Alabama Certified Employee (ACE) • Autodesk – AutoCAD Certified User • Autodesk – Fusion 360 Certified User • Autodesk – Inventor Certified User	<ul> <li>ibution with topics that include turbines, tudents will also gain knowledge and skills</li> <li>and DC systems.</li> <li>In Demand Occupations</li> <li>Civil Engineer</li> <li>Electrical Engineer</li> <li>Environmental Scientist/Specialist</li> </ul>				
commitment to training provid Career Pathway Program Course Number 13997G1003 13997G1001 17049G1000 21049G1000 21049G10025 20101G1013 20101G1023	the conditions in a MOU and participation in mandatory ed by the provider. *SREB (Must teach three c Energy and Power program allows students to understand motor/generator sets, renewable and non-renewable energ about single and multiple phase generation and distributio Career Pathway Program Courses Career Pathway Project in Manufacturing CTE Lab in Manufacturing Safety and Health Regulations SREB Advanced Science and Engineered Systems SREB Electronics and Control Systems	ourses from this program list within t         various means of power generation and distri         y generation, and electrochemical systems. St         n systems, transformers, and high voltage AC         Career Readiness Indicator (CRI)         • Alabama Certified Employee (ACE)         • Autodesk – AutoCAD Certified User         • Autodesk – Fusion 360 Certified User         • Autodesk – Inventor Certified User         • Solid Edge Certified Associate	<ul> <li>ibution with topics that include turbines, tudents will also gain knowledge and skills 2 and DC systems.</li> <li>In Demand Occupations         <ul> <li>Civil Engineer</li> <li>Electrical Engineer</li> <li>Environmental Scientist/Specialist</li> </ul> </li> </ul>				

Career Pathway Program	*SREB AC Integrated Production Technologies Program (Must teach three courses from this program list within two years.) 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 mo 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)	<ul> <li>Manufacturing Operations Manager</li> </ul>		
13997G1001	CTE Lab in Manufacturing	<ul> <li>FANUC CERT – Handling Tool</li> </ul>	Manufacturing Operations Technician		
17049G1000	Safety and Health Regulations	<ul> <li>Operations and Programming</li> <li>MSSC – Certified Production Technician (CPT) (Each module will</li> </ul>			
13104G1001	SREB Advanced Technology for Design and Production				
13104G1004	SREB Design for the Production of Advanced Products				
13104G1003	SREB Mechatronic Systems for Advanced Production	count as a CRI)			
13104G1002	SREB Systems of Advanced Technology	• NCCER Core (module 6 is an			
utilizing any o commitment to	As must contact SREB for additional information prior to f the course codes listed above, as it does require to the conditions in a MOU and participation in mandatory led by the provider.	elective and is not required for CRI)			

### 2024-2025 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	
17106G1001	Direct Current	13104G1001	SREB Advanced Technology for Design and Production	
13204G1006	Drill Press	13104G1013	SREB Advanced Concepts in Materials Joining	
20101G1033	Electronics and Control Systems	21049G1000	SREB Advanced Science and Engineered Systems	
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 Health Science 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: <a href="https://www.alabamaachieves.org/career-and-technical-education/cte-courses-of-study/">https://www.alabamaachieves.org/career-and-technical-education/cte-courses-of-study/</a>.

## **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 Safety and Health Regulations	Introduction to Manufacturing Safety and Health Regulations	Introduction to Manufacturing Safety and Health Regulations	Introduction to Manufacturing Safety and Health Regulations	Introduction to Manufacturing Safety and Health Regulations	Workforce Readiness
Concentrator Course(s)	Advanced Drafting Design Engineering Design Applications Intermediate Drafting Design Introduction to Drafting Design Introduction to Engineering Design Three-Dimensional Solid Modeling I Three-Dimensional Solid Modeling II	Alternating Current Digital Electronics Direct Current Electronics and Control Systems Embedded Arduino Controls Introduction to Robotics Robotics Applications Semiconductors Telecommunications Cabling	Industrial Maintenance Electrical & Instrumentation I Industrial Maintenance Electrical & Instrumentation II Industrial Maintenance Electrical & Instrumentation III	Industrial Maintenance Mechanical I Industrial Maintenance Mechanical II Industrial Maintenance Mechanical III	Manufacturing I: Safety Manufacturing II: Quality Manufacturing III: Production Manufacturing IV: Maintenance	Manufacturing I: Safety Manufacturing II: Quality Manufacturing III: Production
Capstone Course(s)	Career Pathway Project in Manufacturing CTE Lab in Manufacturing	Career Pathway Project in Manufacturing CTE Lab in Manufacturing	Career Pathway Project in Manufacturing CTE Lab in Manufacturing	Career Pathway Project in Manufacturing CTE Lab in Manufacturing	Career Pathway Project in Manufacturing 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 Safety and Health Regulations	Introduction to Manufacturing 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 Computer-Aided Design and Computer-Aided Design and Computer-Aided Manufacturing II Computer Numerical Control (CNC) I Computer Numerical Control (CNC) II Coordinate Measuring Machine Drill Press Intermediate Lathe and Bench Work Introduction to Lathe Introduction to Precision Machining Milling and Surface Grinder I Milling and Surface Grinder II	Computer Integrated Automation Computer Integrated Design Computer Integrated Production Electronics and Control Systems Introduction to Robotics Robotics Application Robotics and Automation	SREB Advanced Concepts in Materials Joining SREB Applications in Automated Materials Joining SREB Introduction to Automated Materials Joining SREB Projects in Automated Materials Joining	SREB Clean Energy Application SREB Clean Energy Innovation SREB Clean Energy Strategies SREB Clean Energy Systems	SREB Advanced Technology for Design and Production SREB Design for the Production of Advanced Products SREB Mechatronic Systems for Advanced Production SREB Systems of Advanced Technology
Capstone Course(s)	Career Pathway Project in Manufacturing CTE Lab in Manufacturing	Career Pathway Project in Manufacturing CTE Lab in Manufacturing	Career Pathway Project in Manufacturing CTE Lab in Manufacturing	Career Pathway Project in Manufacturing CTE Lab in Manufacturing	Career Pathway Project in Manufacturing 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 <u>Memorandum FY22-2065</u>.

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.