MCESC Montgomery County Educational Service Center — Business Advisory Council

Montgomery County Advanced Manufacturing Pathway

Regional pathway models support the alignment of stakeholders including employers, higher education, K–12, and workforce, to ensure pathways prepare young people for careers with family-supporting wages and build a robust talent pipeline for employers. Pathway models demonstrate a vision from 8th grade to career including high school coursework, college and career preparation activities, potential postsecondary programs, and in-demand jobs in the regional labor market. This is a living document that will need to be updated regularly to reflect current education programs and workforce needs.

Academic Coursework

This general coursework is recommended for all students in the advanced manufacturing pathway.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12
Career Focused Courses		Foundational Advanced Manufacturing or CCP Course such as: ⊕ MET 1131–Personal Computer Applications for Engineering Technology ⊕ CAM 1109–Fundamentals of Tooling and Machining	Strategic CCP Course such as: ⊕ EET 1120–Introduction to DC and AC Circuits ⊕ EGR 1106–Basic Mechanical and Technical Skills	Strategic CCP Course such as: ⊕ COM 2211–Effective Public Speaking
English	Grade 8 English	English I English II	English III	English IV ⊕ ENG 1101–English Composition I
Math	Grade 8 Math or Algebra I	Algebra I Geometry	Algebra II	Trigonometry/Calculus ⊕ MAT 1470–College Algebra
History	Social Studies	World History	US History	US Government
Science	Physical Science	Biology	Chemistry	Physics

⊕ College Credit Plus (CCP) courses apply to a broad range of postsecondary programs in advanced manufacturing. The credits apply to both high school and postsecondary requirements, saving students time and money.

College and Career Preparation

These additional activities support students in preparing for both college and career. Work-based learning enables students to apply their academic learning in a real-world setting. Advising supports students in making decisions that align best with their strengths and future goals. Competencies describe the technical skills students need for a successful career in advanced manufacturing.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12
Work-Based Learning	Career Exploration: • Workforce Sector Course—Advanced Manufacturing • Work-Site Tours • Power Lunches • Pathway Fairs	Career Planning: • Job Shadow • HR Interview • Virtual Pathway Mentor • Resume Prep	Career Planning: • Internship • Career Fair • Mock Interview	Career Planning: • Internship • Career Fair • Mock Interview
Advising	• YouScience	• Individualized College and Career Plan (ICCP) • Confirmation of Pathway • Identification of Credentials and College Options • Revisit ICCP	• Financial Literacy Course • College Application Prep Work • Industry Recognized Credential Examination	• Free Application for Federal Student Aid (FAFSA) • Complete Ohio Means Jobs (OMJ) Readiness Seal • College and Career Signing Day
Competencies	• Employability Skills	• Equipment Safety • Manufacturing Environment • Personal Health and Safety • Spatial Reasoning • Process, Design, and Development • Installation	• Customer Focus • Quality Assurance and Continuous Improvement • Digital Manufacturing • Supply Chain Logistics	• Individualized Specialization

Manufacturing Competencies

Equipment Safety
Students can use their understanding of equipment usage, practices, and procedure to maintain a healthy, safe, and secure work environment.

Manufacturing Environment
Students can use their understanding of workstations, tools, and equipment operations to safely navigate a manufacturing environment.

Personal Health and Safety
Students can use their understanding of personal safety and environmental regulations to comply with local, federal, and company health/safety demands.

Spatial Reasoning
Students can use their understanding of objects in relation to one another to understand three-dimensional imaging.

Process, Design, and Development
Students can use their understanding of technical drawings and schematics to complete the design and development process.

Installation
Students can use their understanding of tools to assemble and disassemble simple tools.

Customer Focus
Students can use their understanding of communication and project management to understand client needs and complete projects accordingly.

Quality Assurance and Continuous Improvement
Students can use their understanding of product and process to meet quality systems requirements as defined by customer specifications.

Digital Manufacturing
Students can use their understanding of digital manufacturing tools and computer-based programs to complete the development and design for implementation processes.

Supply Chain Logistics
Students can use their understanding of materials, suppliers, and internal systems to plan and monitor movement and storage of materials and products.

Selected Postsecondary Options

The selected postsecondary credentials in advanced manufacturing are based on program options and transfer agreements at Sinclair Community College, except for the welding program, offered through Hobart Institute. Some education paths have credentials that easily stack or build from the previous credential, while others are not as easily stackable. Stackable credentials can help an individual progress in their career pathway or move up a career ladder to different or higher paying jobs.

	⊕ Initial Credentials	Stackable Credentials	Potential Occupational Outcome
Engineering Technology	• Industrial Engineering Technology Associate of Applied Science Students eligible to take the following certification exam: Six Sigma Green Belt Certification	• Bachelor of Science in Industrial Engineering Technology (with additional transfer courses)	• Engineering Technicians • Quality Control Technicians • Production Supervisors • Continuous Improvement Specialists
	• Mechanical Engineering Technology Associate of Applied Science Students eligible to take the following certification exam: Certified SolidWorks Associate (CSWA) IRC	• Bachelor of Science in Mechatronics Engineering • Bachelor of Science in Mechanical and Manufacturing Engineering Technology	• Mechanical Engineering Technicians
	• Automation and Control Technology with Robotics Students eligible to take the following certification exam: FANUC Handling Tool		• Control System Technician and Designer • Systems Engineering Technician • Industrial Equipment Professional
Welding (Hobart Institute)	• Pathway Welding Program Students eligible to take four nationally recognized certifications: AWS® D1.1 Shielded Metal Arc Welding AWS® D1.1 Flux Cored Arc Welding AWS® D1.6 Gas Tungsten Arc AWS® D1.1 Gas Metal Arc Welding Pulsed Spray Transfer	• Welder-Fabricator Pathway Students eligible to take two additional nationally recognized certifications: AWS® D1.1 Gas Metal Arc Welding Pulsed Spray 3G AWS® D1.1 Flux Cored Arc Welding Self-shielded	• Welder
Computer Aided Manufacturing	• Computer Aided Manufacturing/CNC Technology Associate of Applied Science		• Machinist/CNC Machinist • Process Improvement Specialist
Guided Transfer	• Engineering and Engineering Technology University Transfer Associate of Science	Several options including, but not limited to: • Bachelor of Science in Civil Engineering • Bachelor of Science in Electrical Engineering • Bachelor of Science in Mechanical Engineering • Bachelor of Science in Industrial Engineering	• Engineer

Selected Occupations, Wages, and Job Growth

The advanced manufacturing careers listed below are projected to have job openings over the next five years in the region. The living wage ($28.66/hour) is from the MIT Living Wage Calculator for one adult and one child in Montgomery County in 2022. Like all industries, many high-wage jobs in advanced manufacturing require a bachelor's degree or beyond. However, there are a few jobs below that don't require a four-year degree and pay over $20/hour. In manufacturing, there are few defined career advancement opportunities, but one such opportunity is moving into a managerial/supervisory role. The last column in the table shows the occupation's risk of being affected by automation, a factor to consider as individuals plan for their careers.

Typical Job	Pays Living Wage ($28.66)	Median Hourly Earnings	Entry Level Wages	Positions (2021)	Average Annual Openings	Expected Growth (2021–2026)	Typical Education Required	Higher-than-Average Risk of Automation
Electronics Engineers	Yes	$53.67	$42.73	1,388	87	-2%	Bachelor's degree	No
Software Developers and Software Quality Assurance Analysts and Testers	Yes	$44.13	$26.68	5,640	482	11%	Bachelor's degree	No
Mechanical Engineers	Yes	$43.37	$34.38	1,213	79	4%	Bachelor's degree	No
Industrial Engineers	Yes	$38.47	$31.96	1,114	85	8%	Bachelor's degree	No
Electrical and Electronics Repairers	Yes	$31.38	$28.24	78	7	6%	Postsecondary certificate	No
Supervisors/Managers	Yes	$30.77	$24.53	2,052	190	2%	High school diploma or equivalent	No
Machinist/CNC Machinist	No	$23.20	$17.88	2,050	206	4%	High school diploma or equivalent	Yes
Welders, Cutters, Solderers, and Brazers	No	$20.89	$17.72	663	82	8%	High school diploma or equivalent	Yes
Maintenance Repair Workers	No	$19.80	$16.09	3,277	320	0%	High school diploma or equivalent	Yes
Inspector/Quality Assurance Auditor	No	$18.93	$16.21	1,855	196	-6%	High school diploma or equivalent	Yes

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