

REGIONAL PATHWAY MODELS



MCESC

MONTGOMERY
COUNTY
EDUCATIONAL
SERVICE CENTER

**BUSINESS
ADVISORY
COUNCIL**

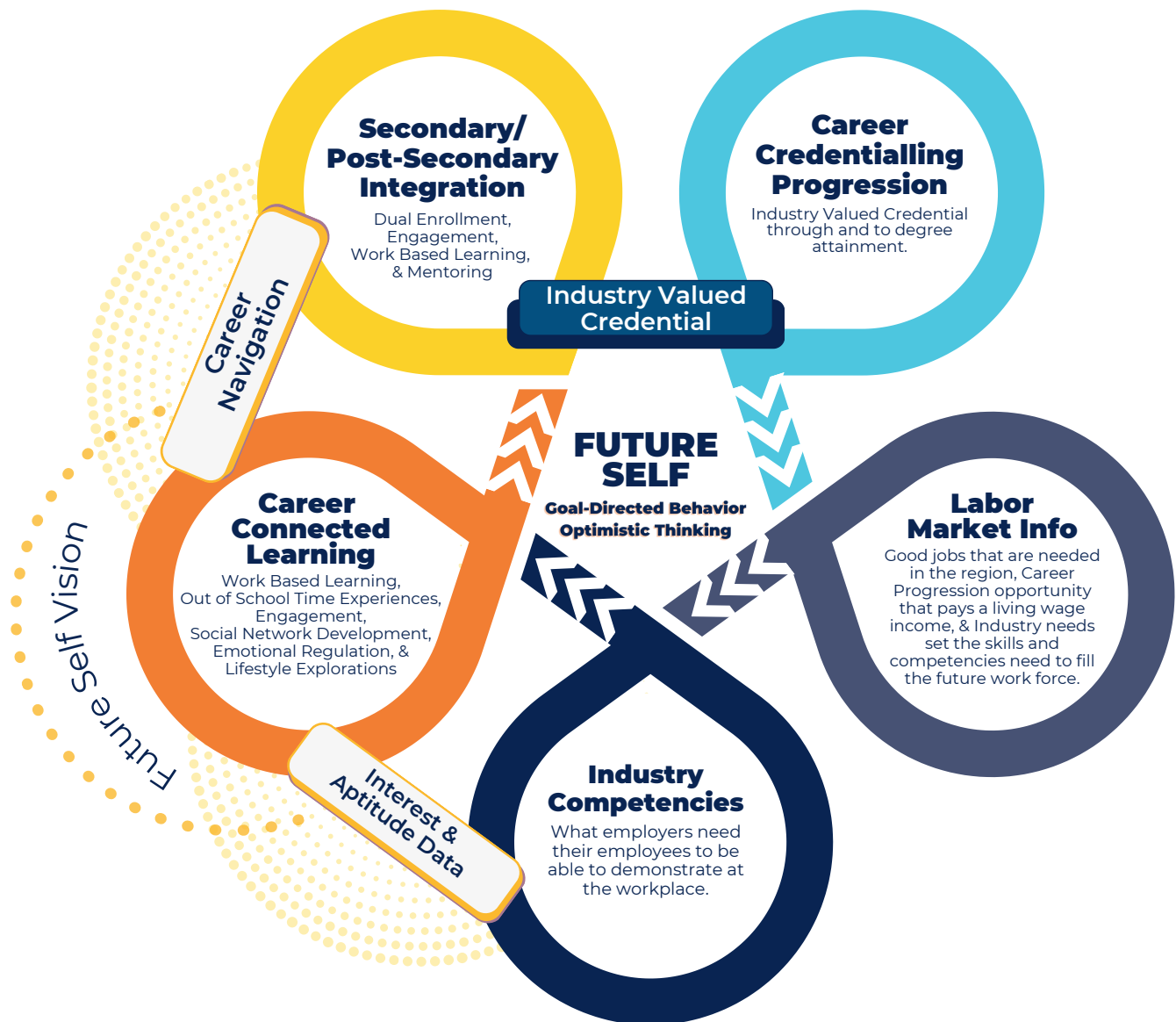


The future of our workforce depends on clear, well-defined pathways that effectively connect students to career opportunities. Regional Pathway Models align students, educators, employers, and workforce leaders to ensure young people are prepared for in-demand careers that offer family-sustaining wages.

The Regional Pathway Models are intended to support more seamless transitions from high school to college to career. Pathway Models demonstrate the full vision of pathways, beginning with identifying high-demand jobs, and then backward mapping to educational opportunities that will prepare young people for these jobs, including potential postsecondary programs, high school coursework, and college and career preparation activities. These in-demand pathways demonstrate the different positions available in these industries and the varying income levels associated with each position.

In conjunction with these pathways, we have developed a comprehensive framework that integrates research and evidence based interest and natural aptitude data. By harnessing this data, we can offer more personalized guidance, ensuring that students embark on paths that align with their aptitudes, interests, and demands in the workforce. With a clearer understanding of their potential, students can make more informed decisions regarding their education and career trajectories, ultimately fortifying the regional talent network.

MCESC Conceptual Career Pathway Framework



Montgomery County

Information Technology/Computer Science 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 IT/computer science pathway.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12	
Career Focused Courses	Information Technology Networking Programming	Foundational IT/Comp Sci or CCP Course such as: ⊕ CIS 1107–Introduction to Operating Systems ⊕ BIS 1120–Introduction to Software Applications ⊕ BIS 1105–IT Fundamentals	Strategic CCP Course such as: ⊕ CIS 1130–Network Fundamentals ⊕ CIS 1111–Introduction to Problem Solving and Computer Programming	Strategic CCP Course such as: ⊕ CIS 1140–Information Systems Analysis and Design ⊕ CIS 2165–Database Management	+ Note: College Credit Plus courses apply to both high school and postsecondary requirements, saving students time and money. Students who complete the following six courses can earn the IT Fundamentals Certificate at Sinclair Community College: BIS 1120, CIS 1107, CIS 1111, CIS 1130, CIS 1140, CIS 2165
English	Grade 8 English	English I English II	English III	English IV ⊕ ENG 1101–English Composition I	
Math	Algebra I	Geometry ⊕ MAT 1470–College Algebra	Algebra II	Trigonometry/Calculus	
History	Social Studies	World History	US History	US Government	
Science	Physical Science	Biology	Chemistry	Physics	

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 information technology and computer science.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12
Work-Based Learning	Career Exploration: • Career Adventures Course—IT • 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 • Exposure to Related Software Languages
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 Course	• User and Customer Support • Principles of IT Systems and Concepts • Principles of Data and Documentation • Logic and Fundamentals of Computer Languages • Principles of Software • Word Processing, Spreadsheet, and Presentation Software	• Security, Compliance, and Risk Management • Routing and Network Configurations • Servers and Storage • Fundamentals of Cloud Computing and Virtualization	• Individualized Specialization

IT/Computer Science Technical Competencies

User and Customer Support

Use understanding of the range of services and customer-focused approaches used to provide assistance and technical support in order to help users solve problems and implement solutions related to IT.

Principles of IT Systems and Concepts

Use understanding of fundamental IT concepts, systems, platforms, and tools to understand the common roles and career trajectories of IT professionals.

Principles of Data and Documentation

Use understanding of numerical sequencing, information flow, data, and record keeping in order to understand the role of technology in converting data into organized content and maintaining accurate records.

Logic and Fundamentals of Computer Languages

Use understanding of how computer languages communicate to build basic mobile and web applications.

Principles of Software

Use understanding of designing, writing, testing, and maintaining source code of computer program to manage, maintain, and edit software.

Word Processing, Spreadsheet, and Presentation Software

Use understanding of Microsoft Office and Google Suite to create written documents, organize data, and develop visual presentations.

Security, Compliance, and Risk Management

Use understanding of malware, firewall, IDS, and legal or regulatory requirements to recognize basic threats to networked computers and ensure procedures are in place for compliance.

Routing and Network Configurations

Use understanding of common networking protocols to explain the purpose of routing, monitoring, and network configurations.

Servers and Storage




Use understanding of data backup systems to store and recover information.

Fundamentals of Cloud Computing and Virtualization

Use understanding of the features, benefits, and concepts of virtualization to differentiate among types of cloud services.

Selected Postsecondary Options

The selected postsecondary credentials in IT/computer science are based on program options and transfer agreements at Sinclair Community College. 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. Within the fields of IT and computer science, a particular education credential can prepare students for a variety of occupations.

	 Potential Initial Credential	 Stackable Credentials	 Typical Occupational Outcome	
Computer Information Technology	<ul style="list-style-type: none">• CompTIA A+• CompTIA IT Fundamentals+	<ul style="list-style-type: none">• Computer Information Systems—User Support Associate of Applied Science Students eligible to take the following certification exams: A+, Network+, Security+, MCSA Exam TestOut Client Pro	<ul style="list-style-type: none">• Computer Information Systems Bachelor of Science	<ul style="list-style-type: none">• Computer Network Support Specialist• Computer User Support Specialist
	<ul style="list-style-type: none">• CompTIA IT Fundamentals+• CompTIA A+• CCENT• Network+• MTA	<ul style="list-style-type: none">• Computer Information Systems—Network Engineering Associate of Applied Science Students eligible to take the following certification exams: CCNA, Security+, A+*, MCSA Exam TestOut Server Pro 2016: Install and Storage* *This credential is connected to an optional elective course, students need to take that specific elective in order to take the certification exam.		<ul style="list-style-type: none">• Network Administrator• Network Security Analyst• Network Engineer
	<ul style="list-style-type: none">• CompTIA IT Fundamentals+• MTA• CompTIA A+• OCAJ	<ul style="list-style-type: none">• Computer Information Systems—Software Development Associate of Applied Science Students eligible to take the Network+ certification exam		<ul style="list-style-type: none">• Software Developer• Web Developer• Help Desk Analyst• Network Administrator• User Support Specialist• Network Security Analyst• Network Engineer
Cybersecurity: Prevention and Investigation Technology	<ul style="list-style-type: none">• CompTIA IT Fundamentals+• CompTIA A+• MTA	<ul style="list-style-type: none">• Computer Information Systems—Secure System Administration Associate of Applied Science Students eligible to take the following certification exams: Network+, Linux+, Security+, MCSA Exam TestOut Server Pro 2016: Install and Storage, MCSA Exam TestOut Server Pro 2016: Networking, MCSA Exam TestOut Server Pro: Identify, Securing Windows Network Environment 2016 Exam	<ul style="list-style-type: none">• Information Technology and Cybersecurity Bachelor of Science	<ul style="list-style-type: none">• Cybersecurity Analyst/Technician• Cyber Crime Analyst/Investigator• Incident Analyst/Responder• IT Auditor
	<ul style="list-style-type: none">• CompTIA IT Fundamentals+	<ul style="list-style-type: none">• Cyber Investigation Technology Associate of Applied Science Students eligible to take the following certification exams: A+, Network+, Linux+, Security+, MCSA Exam TestOut Server Pro 2016: Install and Storage, Securing Windows Network Environment 2016 Exam		<ul style="list-style-type: none">• Intelligence Analyst• IT Specialist• Systems Administrator• Network Engineer• Information System Security Manager• Cyber Security Incident Response Specialist• Private Investigator
Guided Transfer	<ul style="list-style-type: none">• CompTIA IT Fundamentals+• CompTIA A+• CompTIA Security+	<ul style="list-style-type: none">• Computer Science Associate of Science	<ul style="list-style-type: none">• Computer Science Bachelor of Science	<ul style="list-style-type: none">• Software Developer• Software Engineer• Data Engineer

Selected Occupations, Wages, and Job Growth

The IT and computer science careers listed below are projected to grow in the region. The living wage (\$23.16/hour) is from the MIT Living Wage Calculator for one adult and one child in Montgomery County in 2021. Note that all occupations included have median hourly earnings above a living wage, but that some jobs have a large pay range; this means that employees who have less experience, credentials, and skills can be paid significantly less than the median wage, which can be seen in the “entry level wages” column. The last column shows national data on how many workers in these positions have a bachelor’s degree or higher, indicating that for some positions, a four-year degree is an important credential.

Typical Job	Alternate Job Titles	Pays Living Wage (\$23.16)		Positions (2020)	Expected Growth (2020–2025)		Typical Work Experience Required	Workers with a Bachelor’s or Higher*
		Median Hourly Earnings	Entry Level Wages		Positions	Percent		
Software Developers	<ul style="list-style-type: none"> • Application Developers • Systems Engineer 	\$44.13	\$26.68	5,561	646	12%	None	85%
Computer Systems Analysts	<ul style="list-style-type: none"> • Information Technology Analyst 	\$42.09	\$26.36	1,740	127	7%	None	73%
Computer and Information Systems Managers	<ul style="list-style-type: none"> • Application Development • Director IT Director 	\$63.86	\$41.01	943	92	10%	5+ Years	73%
Computer User Support Specialists	<ul style="list-style-type: none"> • Desktop Support Technician • Help Desk Analyst 	\$25.39	\$15.82	2,129	71	3%	None	48%
Information Security Analysts	<ul style="list-style-type: none"> • Information Security Officer • Network Security Analyst 	\$47.61	\$27.32	373	65	17%	Less Than 5 Years	67%
Network and Computer Systems Administrators	<ul style="list-style-type: none"> • Network Administrator • Systems Administrator 	\$37.41	\$23.56	955	27	3%	None	54%
Computer Network Architects	<ul style="list-style-type: none"> • Network Analyst • Network and Security Engineer 	\$43.36	\$28.72	293	23	8%	5+ Years	57%
Web Developers	<ul style="list-style-type: none"> • Web Designer • Webmaster 	\$38.45	\$21.03	750	6	1%	None	68%

This document was developed by JFF, Learn to Earn Dayton, and the Montgomery County ESC. Special thanks to Sinclair Community College and the Technology First Workforce Committee for your feedback and contributions.

Montgomery County Health Science 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 health science pathway.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12	
Career Focused Courses	Health Science and Technology	Foundational Health Science or CCP Course such as: + ALH 1101–Introduction to Healthcare Delivery	Strategic CCP Course such as: + HIM 1101–Medical Terminology	Strategic CCP Course such as: + PSY 1100–General Psychology	+ College Credit Plus (CCP) courses apply to a broad range of postsecondary programs in health science. The credits apply to both high school and postsecondary requirements, saving students time and money.
English	Grade 8 English	English I, English II + ENG 1101–English Composition	English III + COM 2206–Interpersonal Communication	English IV + COM 2206–Interpersonal Communication	
Math	Grade 8 Math or Algebra I	Algebra I, Geometry + MAT 1470–College Algebra	Algebra II	Trigonometry/Calculus + MAT 1470–College Algebra	
History	Social Studies	World History	US History	US Government	
Science	Physical Science	Biology + BIO 1107–Human Biology	Chemistry	Physics + BIO 1141–Principles of Anatomy & Physiology I	

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 the health sciences.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12
Work-Based Learning	Career Exploration: • Career Adventures Course—Healthcare • 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	• Computer Applications, Records, and Data Recording • Professional Working Environments • Healthcare Rules and Regulations • Healthcare Industry Ethics • Healthcare Confidentiality	• Medical Terminology • Customer Service and Patient Focus • Healthcare Safety Systems and Environment • Healthcare Professional Licensure • Healthcare Sanitation	• Individualized Specialization

Health Science Technical Competencies

Computer Applications, Records, and Data Recording

Use understanding of keyboarding, data entry, and word processing to accurately record information on health technology systems.

Professional Working Environments

Use understanding of the importance of a sequence of tasks, cross-functional working environments, and professional communication to successfully work as part of a team.

Healthcare Rules and Regulations

Use understanding of basic laws and regulations (Patient Bill of Rights, CLIA, EMTALA, OSHA, etc.) to meet accreditation standards and obey the law.

Healthcare Industry Ethics

Use understanding of confidentiality, morality, and legal concepts to evaluate and apply the merits, risks, and social concerns to workplace decisions.

Healthcare Confidentiality

Use understanding of HIPAA in order to adhere to legal requirements and maintain confidentiality.

Medical Terminology

Use understanding of basic medical terminology, including abbreviations, acronyms, and diagnostic terms, to communicate effectively with healthcare personnel and patients.

Customer Service and Patient Focus

Use understanding of communication, active listening, and conflict resolution to identify and meet the needs of a patient or customer.

Healthcare Safety Systems and Environment

Use understanding of health and safety procedures and protocols to ensure a safe, secure, and healthy work environment.

Health Professional Licensure




Use understanding of appropriate industry education requirements, licensure, and certification to ensure adherence to regulations that guide service delivery.

Healthcare Sanitation

Use understanding of health cleanliness regulations and sanitation procedures to ensure that healthcare facilities and tools meet standards for cleanliness.

Selected Postsecondary Options

The selected postsecondary credentials in health science are based on program options and transfer agreements at Sinclair Community College. 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.

		 Potential Initial Credential	 Stackable Credentials			 Typical Occupational Outcome
	Allied Health	Radiographer	Associate of Applied Science in Radiologic Technology—students eligible to take the ARRT exam	Advanced Imaging Certifications e.g.: Computed Tomography (CT), Magnetic Resonance Imaging (MRI), and Mammography Bachelor of Radiation Science Technology Bachelor of Science in Healthcare Administration		Radiologic Technician
		State Tested Nurse Aide (STNA)	Associate of Applied Science in Respiratory Care	Bachelor of Science in Respiratory Care Bachelor of Health Sciences Bachelor of Science in Healthcare Administration		Respiratory Therapist
		Certified Dental Assistant	Associate of Applied Science in Dental Hygiene—students eligible to take state board exams and apply for state licensing	Expanded Function Dental Auxiliary (EFDA) Continuing Education Programs e.g.: Local Anesthesia and Nitrous Oxide for Dental Hygiene		Dental Hygienist
	Nursing	State Tested Nurse Aide (STNA) Licensed Practical Nurse (LPN)	Associate of Applied Science (AAS) in Nursing—students eligible to take RN exam	Bachelor of Science in Nursing (BSN)	Master of Science in Nursing (MSN)	Nurse
	Guided Transfer (pre-med, pre-dentistry, or other advanced degree track)	State Tested Nurse Aide (STNA)	Associate of Science in Pre-Professional Studies	Bachelor of Science	Doctoral Degree	Physician (Doctor or Dentist)

Selected Occupations, Wages, and Job Growth

The health science careers listed below are projected to grow in the region. The living wage (\$23.16/hour) is from the MIT Living Wage Calculator for one adult and one child in Montgomery County in 2021. Note that some jobs in the table do not pay a living wage and do not easily stack to further credentials, making economic advancement difficult.

						Expected Growth (2020–2030)	
Typical Job	Pays Living Wage (\$23.16)	Median Hourly Earnings	Preferred Education	Stackable Credential	Positions (2020)	Positions	Percent
Home Health and Personal Care Aides	No	\$11.33	Short-Term Home Health Aide Certificate	Not typically stackable	3,458	860	25%
Medical Assistants		\$16.53	Medical Assistant Technology (AAS)		1,701	432	25%
Emergency Medical Technicians and Paramedics		\$16.53	Emergency Medical Services (AAS)		502	159	32%
Phlebotomists		\$16.85	Short-Term Phlebotomy Certificate		742	144	19%
Medical and Health Services Managers	Yes	\$47.22	Health Information Management/ Administration (BS)	Health Administration (MS)	808	116	14%
Respiratory Therapists		\$28.60	Respiratory Care (AAS)	Respiratory Care (BS)	584	71	12%
Radiologic Technicians		\$28.24	Radiographic Technology (AAS)	Radiation Science Technology (BS)	626	43	7%
Diagnostics Medical Sonographers		\$35.77	Diagnostic Medical Sonography (AAS)	Diagnostic Medical Sonography (BS)	284	39	14%
Dental Hygienists		\$34.00	Dental Hygiene (AAS)	Expanded Function Dental Auxiliary (EFDA) License	644	20	3%
Registered Nurses	Yes	\$32.61	Nursing (BS)	Nursing (MS)	10,190	611	6%
Nurse Practitioners		\$51.02	Nursing (MS)	Terminal degree for this occupation	672	174	26%
Physicians	Yes	\$101.08	Doctor of Medicine (MD)	Terminal degree for this occupation	1,220	141	12%


This document was developed by JFF, Learn to Earn Dayton, and the Montgomery County ESC. Special thanks to the Greater Dayton Area Hospital Association (GDAHA) Education Subcommittee and Sinclair Community College for your feedback and contributions.

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	 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.
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 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


This document was developed by JFF, Learn to Earn Dayton, and the Montgomery County ESC. Special thanks to Sinclair Community College, Hobart Institute of Welding Technology, and the Dayton Region Manufacturers Association for their feedback and contributions.

Montgomery County Elementary Educator 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 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 Education pathway.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12	
Career Focused Courses		Foundational Education or CCP Course such as: ECE 1101 - Introductory to Child Development	ECE 2200 - Families, Communities, & Schools	EDU 1100 - Introduction to Education	 College Credit Plus (CCP) courses apply to a broad range of postsecondary programs in education. The credits apply to both high school and postsecondary requirements, saving students time and money.
English	Grade 8 English	English II English III	ENG 1101 - English Composition I	ENG 1201 - English Composition II	
Math	Grade 8 Math/Algebra	Algebra I/Geometry	Algebra II	Trigonometry/Calculus	
History	Social Studies	World History American History HIS 1101* - US History	World History Social Studies Elective**	US Government	
Science	Physical Science	Biology	Chemistry	Physics	

*Miami University students replace with HIS 1112: Western Civilization **Optional

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 skills and knowledge students need for a successful career in education career fields.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12
Work-Based Learning	<ul style="list-style-type: none"> Job Shadow Peer Tutoring 	<ul style="list-style-type: none"> Job Shadow Join Educator Rising/Participate in a Grow Your Own Program at your HS Summer work with childcare, tutoring, student programs, etc. 	<ul style="list-style-type: none"> Job Shadow Job Fair Mock Interview Participate in Educator Rising/Participate in a Grow Your Own Program at your HS Summer work with childcare, tutoring, student programs, coaching, etc. 	<ul style="list-style-type: none"> Job Shadow Job Fair Mock Interview Educator Rising Participate in a Grow Your Own Program at your HS Summer work with childcare, tutoring, student programs, coaching etc.
Advising	<ul style="list-style-type: none"> YouScience 	<ul style="list-style-type: none"> Identification of Credential and College Options Financial Literacy Course Begin Ohio Means Jobs Readiness Seal College Application Prep Work 	<ul style="list-style-type: none"> Financial Literacy Course Ohio Means Jobs Readiness Seal Identify content area and grade level of interest for teaching license 	<ul style="list-style-type: none"> Complete FAFSA Complete College Application Complete Ohio Means Jobs Readiness Seal College and Career Signing Day
Competencies	<ul style="list-style-type: none"> Employability Skills CPR & First Aid Certification 	<ul style="list-style-type: none"> Written Communication Verbal Communication Organization Responsible Decision Making Social Awareness Relationship Skills Child Development 	<ul style="list-style-type: none"> Ethics in Education Technology Competencies 	<ul style="list-style-type: none"> Individual specialization in grades and subjects of interest

Educational Competencies

Written Communications:

The ability to identify, clearly state, and convey a goal to the reader.

Verbal Communication:

The ability to deliver and understand verbally transmitted information quickly and accurately.

Organization:

The ability to manage many tasks: planning lessons, delivering instruction, scheduling, maintaining records, prioritization, and collaboration.

Social Awareness:

The ability to understand and empathize with the perspectives of others, including those from diverse backgrounds, cultures, and contexts.

Relationship Skills:

The ability to establish and maintain healthy and supportive relationships and to navigate settings with a broad spectrum of individuals and groups.

Responsible Decision Making:

The ability to make caring and constructive choices about personal behavior and social interactions across various situations.

Child Development:

Understand the sequence of physical, intellectual, language, and emotional changes that occur in a child from birth to young adulthood.

Technology Competencies:

The ability to perform and adapt core technology functions necessary for the classroom and functions within an educational setting.

Educational Professional Licensure:

Use understanding of appropriate education requirements, licensure, and certification to obtain appropriate credentials.

Ethics in Education:

Understand the value of educational integrity and the responsibility inherent in the profession of teaching.

Selected Postsecondary Options

The selected postsecondary credentials in the education pathway are based on transfer agreements at Sinclair Community College. Some education paths have credentials that easily stack or build from the previous credential, while others are not easily stackable. Credentials can help individuals document their progress in defined career pathways and help them measure their move up the career ladder into different or higher paying jobs.

Professional Role	 Initial Credential	 Stackable Credentials	 Typical Occupational Outcome
Educational Aide	Educational Aide Permit	<ul style="list-style-type: none"> • Associates degree or 48 semester hours at an accredited college or university • ParaPro Exam 	Educational Aide with ESEA endorsement
Early Childhood Education	Child Development Associate Credential (CDA), Ohio Administrator Credential (OCCRA)	<ul style="list-style-type: none"> • Associates degree, Associate of Arts (AA) or Bachelor of Arts (BA) in Early Childhood Education (Non-Licensure) • Pre-Kindergarten License, Pre-Kindergarten Special Needs, Teaching English to Speakers of Other Languages (TESOL), Adapted Physical Education, Bilingual, Computer/Technology, Computer Science, Drama/Theater 	<ul style="list-style-type: none"> • Pre-kindergarten Teacher • Lead Teacher at Childcare Center or Early Learning Center • Childcare Center Administrator
Elementary Teacher	Teaching License	<ul style="list-style-type: none"> • Bachelors Degree, Early Childhood Generalist License, • Primary (PK-5) License, Teaching English to Speakers of Other Languages (TESOL), Gifted Intervention Specialist, Drama/Theater, Computer Science, Computer/Technology, Bilingual, Adapted Physical Education 	Elementary Teacher
Middle Childhood Education	Teaching License	<ul style="list-style-type: none"> • Bachelors Degree • Middle Childhood License, Middle Childhood Generalist Endorsements (LA, Math, Science, Social Studies) , Teaching English to Speakers of Other Languages (TESOL), Gifted Intervention Specialist, Drama/Theater, Computer Science, Computer/Technology, Bilingual, Adapted Physical Education 	Grades 4-9 Teacher
Adolescent Young Adult Education (AYA)	Teaching License	<ul style="list-style-type: none"> • Bachelors Degree • Adolescent Young Adult (AYA) License, AYA Subject Endorsements, Teaching English to Speakers of Other Languages (TESOL), Gifted Intervention Specialist, Drama/Theater, Computer Science, Computer/Technology, Career Based Intervention, Bilingual, Adapted Physical Education 	Grades 7-12 Teacher
Educational Leadership	Two years of successful teaching experience under a standard teaching license, Master's Degree, Approved Preparation Program, or Alternative pathway	<ul style="list-style-type: none"> • Principal License • Administrative Specialist License • Superintendent License 	<ul style="list-style-type: none"> • Assistant Principal • Principal • Dean of Students • Superintendent • Instructional Coordinator

Additional information about supplemental licensures can be found at the Ohio Department of Education website:

<https://education.ohio.gov/Topics/Teaching/Licensure/Supplemental-License/Supplemental-Teaching-License-for-Endorsement-Area>

Selected Occupations, Wages, and Job Growth

The education careers listed below are projected to grow in the region. The living wage (\$32.08 per hour) is from the MIT Living Wage Calculator for one adult and one child in Montgomery County in 2022. Those pursuing a career in public sector education may choose to explore the additional career benefits unique to the field such as retirement, healthcare, and leave. Note that some jobs in the table do not pay a living wage; however, degree and credential pathways exist in all professions and the following information documents the earning potential for different roles within education.

Occupation	Job Summary	Entry-Level Education	2021 Median Pay	Median Hourly Earnings	Pays Living Wage (\$32.08)	Expected Growth 2020-2030
Teacher Assistants	Teacher assistants work with a licensed teacher to give students additional attention and instruction.	Some college, no degree	\$24,360	\$16	No	9%
Preschool Teachers	Preschool teachers educate and care for children younger than age 5 who have not yet entered kindergarten.	Associate's degree	\$30,210	\$20	No	18%
Elementary School Teachers	Kindergarten and elementary school teachers instruct young students in basic subjects in order to prepare them for future schooling.	Bachelor's degree	\$61,350	\$41	Yes	7%
Middle School Teachers	Middle school teachers educate students typically in sixth through eighth grades.	Bachelor's degree	\$61,320	\$41	Yes	7%
High School Teachers	High school teachers teach academic lessons and various skills that students will need to attend college and to enter the job market.	Bachelor's degree	\$61,280	\$41	Yes	8%
Career & Technical Education Teachers	Career and technical education teachers instruct students in various technical and vocational subjects, such as auto repair, healthcare, and culinary arts.	Bachelor's degree	\$61,160	\$41	Yes	5%
Special Education Teachers	Special education teachers work with students who have a wide range of learning, mental, emotional, and physical disabilities.	Bachelor's degree	\$61,820	\$42	Yes	8%
Elementary, Middle, & High School Principals	Elementary, middle, and high school principals oversee all school operations, including daily school activities.	Master's degree	\$98,490	\$56	Yes	8%
Instructional Coordinators	Instructional coordinators oversee school curricula and teaching standards. They develop instructional material, implement it, and assess its effectiveness.	Master's degree	\$63,740	\$43	Yes	10%
Librarians & Library Media Specialists	Librarians and library media specialists help people find information and conduct research for personal and professional use.	Master's degree	\$61,190	\$41	Yes	9%
School & Career Counselors and Advisors	School counselors help students develop academic and social skills. Career counselors and advisors help people choose a path to employment.	Master's degree	\$60,510	\$41	Yes	11%

Source: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Career and Technical Education Teachers, at <https://www.bls.gov/ooh/education-training-and-library/career-and-technical-education-teachers.htm> (visited August 18, 2022). *living wage calculation based on one adult and one child in Montgomery county in August of 2022 from the MIT Living Wage Calculator (<https://livingwage.mit.edu/counties/39113>)

Montgomery County Aerospace and Aviation 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 eighth 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 regional pathway model 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 aerospace and aviation pathway.

	Middle School/ Grade 8	Grades 9 and 10	Grades 11	Grade 12	
Career Focused Courses		Foundational Aerospace and Aviation or CCP Course such as: <ul style="list-style-type: none"> + MET 1131–Personal Computer Applications for Engineering Technology + AVT 1105–Orientation to Aviation 	Strategic Aerospace and Aviation or CCP Course such as: <ul style="list-style-type: none"> + AVT 1101–Introduction to Unmanned Aerial Systems + AVT2125–Developments in Aviation I 	Strategic Aerospace and Aviation or CCP Course such as: <ul style="list-style-type: none"> + ECO 2160–Principles of Macroeconomics + MAN 1107–Foundations of Business 	<div>+</div> College Credit Plus (CCP) courses apply to a broad range of postsecondary programs in aerospace/aviation. The credits apply to both high school and postsecondary requirements, saving students time and money.
English	Grade 8 English	English I English II + ENG 1101–English Composition	English III	English IV + COM 2211–Effective Public Speaking	
Math	Grade 8 Math or Algebra 1	Algebra I Geometry	Algebra II + MAT 1470–College Algebra	+ MAT 1470–College Algebra + MAT 1570–Analytic Geometry and Trigonometry	
History	Social Studies	World History	U.S. History	U.S. Government	
Science	Physical Science	Biology	Chemistry	Physics + PHY 1141–College Physics I	

College-level English courses can be taken at any grade level in a student's high school career.

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 aerospace and aviation.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12
Work-Based Learning	Career Exploration: <ul style="list-style-type: none"> • Career Adventures Course–Aviation • Work-site tours • Power lunches • Pathways fairs 	Career Planning: <ul style="list-style-type: none"> • Job shadow • HR interview • Virtual pathway mentor • Resume prep 	Career Planning: <ul style="list-style-type: none"> • Internship • Career fair • Mock interview 	Career Planning: <ul style="list-style-type: none"> • Internship • Career fair • Mock interview
Advising	• YouScience	<ul style="list-style-type: none"> • Individualized college and career plan (ICCP) • Confirmation of pathway • Identification of credentials and college options • Revisit ICCP 	<ul style="list-style-type: none"> • Financial literacy course • College application prep work • Industry recognized credential examination 	<ul style="list-style-type: none"> • Complete Free Application for Federal Student Aid (FAFSA) • Complete Ohio Means Jobs (OMJ) Readiness Seal • College and career signing day
Competencies (defined below)	Employability skills	<ul style="list-style-type: none"> • Project Management and Process • Troubleshooting • Technical Writing and Editing • Fundamentals of Physics and Industry Math • Fundamentals of Systems Engineering 	<ul style="list-style-type: none"> • Cybersecurity • Risk Management and Compliance • Quality Assurance and Control • Financial and Resource Management • Fundamentals of Computer Programming and Software Development 	Individualized Specialization

Aerospace/ Aviation Technical Competencies

Project and Process Management
Students can use their ability to interpret project needs, set deadlines, and sequence activities to effectively complete a project in a timely manner.

Troubleshooting
Students can use their ability to apply a systematic approach to identifying, isolating, designing/redesigning, and testing solutions in order to implement a solution or solve a problem.

Technical Writing and Editing
Students can use their understanding of clear, grammatically correct, and concisely written communications to convey accurate messages in professional work plans, emails, and informative documents, including technical and proposal writing.

Fundamentals of Physics, Math, and Chemistry
Students can use their understanding of the basic laws of physics, chemistry, and algebraic logic to apply concepts to projects and solve relevant problems.

Fundamentals of Engineering and Systems
Students can use their understanding of relationships across complex and diverse systems in order to manage and monitor programming to obtain system optimization.

Cybersecurity
Students can use their understanding of operating systems, networks, telecommunications, ethics, and cryptography in order to maintain secure systems.

Risk Management
Students can use their understanding of the standards, applications, and regulatory requirements necessary to protect confidentiality, integrity, and availability of information.



Quality Assurance and Control
Students can use their understanding of digital design, testing, writing, and maintaining source code in order to manage and edit software across its life cycle.

Financial and Resource Management
Students can use their understanding of the principles of managing, monitoring, and controlling resources, including assets, money, and products in order to achieve project expectations.

Fundamentals of Digital Design, Computer Programming, and Software Development
Students can use their understanding of designing, writing, testing, and maintaining source code to manage and edit software.

Postsecondary Options

These selected postsecondary credentials in aerospace and aviation, based on program options and transfer agreements at Sinclair Community College, lead to careers with wages that are over \$25/hour. Stackable credentials can help individuals progress in their career pathway or move up a career ladder to different or higher-paying jobs. In aerospace and aviation, there are a wide variety of subfields, including engineering, manufacturing, computer science, etc. The diversity of subfields is represented in the variety of postsecondary programs included. One common pathway to the aerospace and aviation industry not included below is through the military, but the pathways vary—some students enlist immediately after completing high school and some complete a relevant bachelor's degree before beginning their service.

	 Potential Initial Credential	 Stackable Credentials		 Typical Occupational Outcome
Maintenance	Short-Term Certificates: <ul style="list-style-type: none">• General Aviation Maintenance• Powerplant Aviation Maintenance• Airframe Aviation Maintenance	• Aviation Airframe and Powerplant Maintenance Technology Associate of Applied Science	• Aviation Maintenance Bachelor of Science	• Aviation Maintenance Technician <ul style="list-style-type: none">• Aircraft Mechanic
Operations/Pilot	• Aircraft Dispatcher Short-Term Certificate	• Aviation Technology/ Professional Pilot Associate of Applied Science	• Aviation Technology/ Professional Pilot Bachelor of Applied Science	• Airline Pilot <ul style="list-style-type: none">• Professional Pilot
Unmanned Aerial Systems	• Unmanned Aerial Systems Short-Term Certificate	• Unmanned Aerial Systems Associate of Science	• Unmanned Aerial Systems Bachelor of Science	• Systems Operator <ul style="list-style-type: none">• Drone Pilot
Business Operations	• Business Information Certificate	• Business Administration Associate of Science	• Business Bachelor of Science	• Buyers and Purchasing Agents
Guided Transfer-Engineering	• Engineering and Engineering Technology University Transfer Associate of Science	• Engineering Science <ul style="list-style-type: none">• Engineering Technology Bachelor of Science	• Engineering Master of Science	• Engineer

Selected Occupations, Wages, and Job Growth

The table below includes labor market information about selected aerospace and aviation careers, including median wages and typical education required. The living wage is derived from the MIT Living Wage Calculator and is intended to be sufficient wage to support one adult and one child living in the Dayton metropolitan statistical area. Note that while all of these jobs are expected to have openings in the next 5–10 years, we were not able to include data about specific predicted growth because so many of these jobs are in the military and that data is separate from civilian jobs.

Typical Job	Pays Living Wage (\$34.16)	Median Hourly Earnings	Typical Education Level	What % of workers are age 55+?
Logisticians	Yes	\$43.24	Bachelor's degree	21%
Aircraft Mechanics and Service Technicians	No	\$28.83	Postsecondary nondegree award	13%
Industrial Engineers	Yes	\$38.33	Bachelor's degree	31%
Flight Attendants	Yes	\$34.47	High school diploma	Insufficient data
Airline Pilots, Copilots, and Flight Engineers	Yes	\$97.84	Bachelor's degree	Insufficient data
Aerospace Engineers	Yes	\$53.80	Bachelor's degree	29%
Avionics Technicians	No	\$28.07	Associate's degree	Insufficient data
First-Line Supervisors of Mechanics, Installers, and Repairers	No	\$31.35	High school diploma	31%
Aerospace Engineering and Operations Technicians	No	\$30.18	Associate's degree	31%
Buyers and Purchasing Agents	Yes	\$38.67	Bachelor's Degree	32%
Software Developers	Yes	\$47.26	Bachelor's degree	17%

Montgomery County Business and Management 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 grade 8 to career that includes 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 business and management pathway.

	Middle School/ Grade 8	Grades 9 and 10	Grade 11	Grade 12	
Career Focused Courses		Foundational Business Services or College Credit Plus (CCP) course such as: ⊕ BIS 1120: Intro to Software Application or ⊕ MAN 1107: Foundations of Business*	Strategic Business Services or CCP course such as: ⊕ LAW 1101: Business Law or ⊕ MAN 1107: Foundations of Business	Strategic Business Services or CCP course such as: ⊕ ACC 1210: Accounting or ⊕ ECO 2180: Principles of Microeconomics	⊕ CCP courses apply to a broad range of postsecondary programs in business. The credits apply to both high school and postsecondary requirements, saving students time and money.
English	Grade 8 English	English I English II ⊕ ENG 1101: English Composition College-level English courses can be taken at any grade level in a student's high school career.	English III	English IV ⊕ COM 2211: Effective Public Speaking	
Math	Grade 8 Math or Algebra 1	Algebra I Geometry ⊕ MAT 1120: Business Math	Algebra II ⊕ MAT 1460: Math for Business Analysis	⊕ MAT 2160: Business Calculus or ⊕ MAT 2270: Calculus and Analytic Geometry	
History	Social Studies	World History	U.S. History	U.S. Government	
Science	Physical Science	Biology	Chemistry	Physics	

*Students taking Foundations of Business in grades 9 and 10 will be most successful if the course is paired with structured work-based learning opportunities.

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 best align with their strengths and future goals. Competencies describe the technical skills students need for a successful career in business and management.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12
Work-Based Learning	Career exploration: • Worksite tours • Power lunches • Pathways 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 (grade 8)	• 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	• Complete Free Application for Federal Student Aid (FAFSA) • Complete Ohio Means Jobs Readiness Seal • College and career signing day
Competencies (defined below)	• Employability skills	• Business operations • Customer care • Management principles • Principles of economics and business • Project management	• Data analysis • Entrepreneurship/business innovation • Finance • Marketing • Technical applications	• Individualized Specialization

Business and Management Technical Competencies

Business operations

Students can use their understanding of how to plan, organize, and monitor business processes and functions to assess performance and recommend operational improvements.

Customer care

Students can use their understanding of market demands and professional communication skills to effectively respond to the needs of customers.

Data analysis

Students can objectively identify, analyze, and evaluate data and information to create a solution to a business challenge.

Entrepreneurship/business innovation

Students can use their understanding of idea generation and business development to introduce entrepreneurial ideas for a business.

Finance

Students can use their understanding of financial systems and accounting principles and procedures to examine and assess a business's financial information.

Management principles

Students can use their understanding of interrelated functions of management and leadership abilities to make a strategic decision for a business.

Marketing

Students can use their understanding of marketing strategy, tactics, and decision-making to promote a product or service or create a marketing plan.

Principles of economics and business

Students can use their understanding of micro- and macroeconomics to understand how an economy functions and assess its impact on a business.

Project management

Students can interpret project needs, set deadlines, and plan individual and team workflow and communications to effectively complete projects in a timely manner.

Technical applications

Students can use their ability to rapidly learn and use new technological platforms to efficiently import, organize, and manipulate data for reporting and presentations.

Postsecondary Options

These selected postsecondary credentials in business and management, based on program options and transfer agreements at Sinclair Community College, lead to careers with wages that are more than \$24 per hour. In business services and management, there are a wide variety of subfields, including management, supply chain, and human resources. This diversity of subfields is represented in the variety of postsecondary programs included.

A bachelor's degree is the common point of entry for many business services and management positions. While some occupations in the business field can be obtained with an associate's or applied associate's degree, bachelor's degrees are necessary to help an individual specialize and progress in a career pathway.

Both Wright State University and the University of Dayton offer guided transfer programs, through the Sinclair College Wright Path program and the University of Dayton/Sinclair Academy, respectively. These partnerships allow a student to first obtain an associate's degree from Sinclair while receiving the academic and support benefits of being a student at their university. Upon completion, students transfer to the university to continue pursuing a bachelor's degree, making credit transfers seamless and degree attainment more affordable.

Cluster		Potential Initial Credential	Stackable Credentials ● Wright State ■ University of Dayton	Typical Occupational Outcome
Business Management	Management	Guided Transfer: Business Administration Associate of Science	● Management Bachelor of Science in Business ■ Management Bachelor of Science in Business Administration	● ■ Master of Business Administration • Sales managers • Project management specialist • Management analyst
	Business Operations/ Supply Chain		● Supply Chain Management Bachelor of Science in Business ● Management Information Systems Bachelor of Science in Business ■ Operations and Supply Chain Management Bachelor of Science in Business Administration	● Logistics and Supply Chain Management Master of Science • Logistician • Operations research analyst • Business operations specialist
Business Administration	Marketing		● Marketing Bachelor of Science in Business ■ Marketing Bachelor of Science in Business Administration	● Marketing Analytics and Insights Master of Science ● ■ Master of Business Administration • Market researcher
	Accounting		● Accountancy Bachelor of Science in Business ■ Accounting Bachelor of Science in Business Administration	● ■ Master of Business Administration ■ Master of Professional Accountancy ■ Master of Finance • Accountant
	Human Resources		● Human Resource Management Bachelor of Science in Business	● ■ Master of Business Administration • Compliance officers • Training and development specialists

Selected Occupations, Wages, and Job Growth

The table below includes labor market information about selected business and management careers, including median wages and typical education required. The living wage is derived from the MIT Living Wage calculator and is intended to be a sufficient wage to support one adult and one child living in the Dayton metropolitan statistical area. An entrepreneurship pathway is not captured within the data below due to the nature of the occupation. However, the skills required for these occupations can help prepare a student for entrepreneurial endeavors.

Typical job	Pays living wage (\$34.71)	Median hourly earnings	Number of positions (2023)	Expected growth (2023–2028)		Typical education level	% of workers age 55+
				Positions	Percent		
Accountants and auditors	Yes	\$35.00	2,674	16	1%	Bachelor's degree	28%
Business operations specialists, all other	Yes	\$43.25	4,234	68	2%	Bachelor's degree	28%
Compliance officers	No	\$31.02	618	40	7%	Bachelor's degree	29%
Logisticians*	Yes	\$44.60	1,413	78	6%	Bachelor's degree	22%
Management analysts	Yes	\$43.31	2,128	94	4%	Bachelor's degree	30%
Market research analysts and marketing specialists	No	\$28.19	1,667	49	3%	Bachelor's degree	17%
Operations research analysts	Yes	\$47.17	409	21	5%	Bachelor's degree	28%
Project management specialists	Yes	\$42.63	1,977	33	2%	Bachelor's degree	27%
Sales managers	Yes	\$58.85	917	32	3%	Bachelor's degree	23%
Training and development specialists	No	\$24.82	831	16	2%	Bachelor's degree	26%

*Those in logistician roles are also called production planners, supply chain analysts, and supply specialists.

This document was developed by Jobs for the Future (JFF), Learn to Earn Dayton, and the Montgomery County Educational Service Center. Special thanks to Sinclair Community College, Wright State University, the University of Dayton, and local business and management leaders for your feedback and contributions.

Pathway Models Companion: Civilian Opportunities at Wright-Patterson Air Force Base

Wright-Patterson Air Force Base in Ohio offers in-demand civilian career opportunities aligned to the [pathway models](#) designed by Montgomery County Educational Service Center. These civilian opportunities—available in a range of career fields—are within five units of the U.S. Department of the Air Force (DAF): the Air Force Life Cycle Management Center, Air Force Research Laboratory, National Air and Space Intelligence Center, Air Force Institute of Technology, and 88th Air Base Wing. Work-based learning programs that serve as a stepping stone into civilian opportunities, as well as unique processes for accessing those opportunities, can help students, families, and educators in their pathways planning.

Career Preparation Opportunities

Several programs are offered at Wright-Patterson Air Force Base to support entry into civilian occupations with DAF. These work-based learning opportunities allow current students and recent graduates to explore careers, receive training, and apply learning in a real-world setting. Between 300 and 600 students are placed across these programs annually.

	Program	Description	Benefits	Requirements
Current high school and college students	Pathways Program	Paid part- or full-time internship up to one year in duration with an opportunity to explore federal careers in a range of fields.	<ul style="list-style-type: none"> Tuition assistance 	<ul style="list-style-type: none"> At least 16 years old and currently enrolled in school (high school and above) 2.0 GPA or above
Current college students	Premier College Intern Program (PCIP)	Paid 10- to 12-week summer internship in a range of career fields.	<ul style="list-style-type: none"> Eligible to be non-competitively converted to PAQ following college graduation 	<ul style="list-style-type: none"> Full-time college junior or graduate student 2.95 GPA or above
Recent college graduates	Palace Acquire (PAQ)/ Copper Cap (COP)	Paid, full-time two- to three-year training program in a range of career fields. Provides training and development, mentoring, and on-the-job training. For STEM disciplines, one year of required graduate studies is built into the program.	<ul style="list-style-type: none"> Tuition assistance Student loan repayment of up to \$30,000 Permanent position upon successful completion 	<ul style="list-style-type: none"> Graduated with a bachelor's or a master's degree within the past two years 2.95 GPA or above



Selected Civilian Occupations, Wages, and Occupational Outlook

The table below includes labor market information about DAF civilian occupations at Wright-Patterson Air Force Base that are aligned to growth industries in the Dayton, Ohio, region and the existing pathway models. The occupations shown currently have a significant number of vacancies or percentage of employees nearing retirement in the next five years. Most occupations pay above a living wage for one adult and one child in Montgomery County in 2024, as defined by the MIT Living Wage Calculator.

Occupation title	Current positions (excluding vacancies)	Current vacancies (as of August 2024)	% within five years of minimum retirement age (57)	Typical education required	Average salary	Pays a living wage (\$72,198 annually)
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Advanced Manufacturing

Civil engineer	17	3	41%	Bachelor's or master's	\$113,929	Yes
General engineer	1,377	662	33%	Bachelor's or master's	\$143,210	Yes
Mechanical engineer	258	89	15%	Bachelor's or master's	\$121,081	Yes

Aerospace and Aviation

Aerospace engineer	725	339	20%	Bachelor's or master's	\$129,497	Yes
Aircraft mechanic/ aircraft electrician	73	11	6%	High school	\$75,732	Yes
Airplane pilot/light test pilot	21	4	24%	High school	\$152,640	Yes

Business and Management

Accountant	71	37	37%	Bachelor's	\$119,712	Yes
Acquisition program management	1,517	577	33%	Bachelor's	\$119,742	Yes
Auditor	92	39	36%	Bachelor's	\$128,057	Yes
Contract specialist	1,364	688	17%	Bachelor's	\$108,525	Yes
Data management specialist	162	43	40%	High school or bachelor's	\$97,742	Yes
Financial management specialist	915	368	30%	Bachelor's	\$112,704	Yes
Logistics management specialist	929	280	40%	Associate's or bachelor's	\$112,707	Yes
Management/ program analyst	696	313	47%	High school, associate's, or bachelor's	\$113,656	Yes
Operations research analyst	286	172	25%	Bachelor's or master's	\$124,812	Yes

Health Science*

Medical technician	10	10	50%	High school	\$64,865	No
Health systems and records administration	25	15	48%	High school or bachelor's	\$103,112	Yes
Medical technologist	12	3	25%	Bachelor's	\$113,949	Yes

*Data for medical professions is substantially limited and underrepresented. The Wright-Patterson Medical Center is largely operated by a different federal agency, the Defense Health Agency, and was not available for this publication.

Information Technology and Computer Science

Computer scientist	140	98	27%	Bachelor's	\$128,743	Yes
Computer engineer	115	62	29%	Bachelor's	\$128,090	Yes
IT specialist (all variants/specialties)**	762	246	41%	High school	\$118,444	Yes

**IT specialist can be further categorized by specialty: Policy and Planning, Enterprise Architecture, Information Security, Systems Analysis, Applications Software, Operating Systems, Network Services, etc.

Special Hiring Considerations

The hiring process for federal jobs consists of an application, questionnaire, interview, suitability investigation, and security clearance investigation. Each of these steps is geared toward assessing both the skill and the character of an individual to determine their ability to efficiently perform in a role. The application, questionnaire, and interview help agencies identify an individual's relevant skills and qualifications and assess whether the applicant can perform a job. Suitability and security clearance investigations help identify an individual's character traits, including, but not limited to, trustworthiness, loyalty, and conduct, providing an additional lens to their ability to efficiently perform in a job and manage sensitive information.

Interviews, an important part of the hiring process, tend to follow a standard model that consists of a phone screening and multiple rounds of structured, one-on-one or panel interviews, resulting in the selection of a candidate.

The following steps represent a typical hiring process, though each process will vary depending on the hiring body and type of position.

Application

Job openings can be accessed through [USAjobs.gov](https://www.usajobs.gov), where applicants can find information about vacancies, as well as relevant qualifications and requirements, and apply for available positions. HR staff receive and review applications and determine which meet the minimum requirements. These applicants are then narrowed down to the most qualified.

Questionnaire

After a pool of applicants is selected, the applicants move on to the next step of the process where they are given a questionnaire that requires them to rate themselves on skills and qualifications. These ratings are assigned a point value. The questionnaires then move to the selector for the position, to choose the best qualified applicant package.

Security Clearance

Many federal jobs are contingent upon receiving a security clearance because they are tied to a position. The clearance and suitability process takes place after the applicant accepts a job offer and fills out the required forms and questionnaires, known as a security package. Many of the positions available to high school and college students are either non-sensitive or Public Trust positions requiring no clearance or low-level clearance.

Classification

Prior to the hiring process, positions receive a designation that assesses their risk and sensitivity levels. This measures the level of risk (low, moderate, or high) to the agency, government, or country if the individual performing the job were to cause damage. Sensitivity is whether a position requires access to classified national security information. The security clearance helps determine an individual's eligibility to access national security information. Jobs within the federal government have three classifications:

- Non-sensitive
- Public Trust
- National Security

Non-sensitive positions have low to no risk of posing damage or harm to national security. Public Trust positions are similar but require increased trustworthiness for roles that require more responsibility and sensitivity, including managing finances, protecting people and assets, and compliance.

Clearance Level

The National Security classification is divided into distinct clearance levels. Clearance levels help specify the level of security required to access sensitive information, specifically that which could harm national security if disclosed without proper authorization.

Investigation Requirements

Each subsequent level has additional investigation requirements for obtaining and maintaining that security clearance level. Requirements range from automated background checks and fingerprinting to investigations into former coworkers, residences, and foreign contacts, typically from the past seven or more years.

Time to Receive Security Clearance

Timing to receive a security clearance can vary depending on many factors, including the number of security clearance requests, the need for additional information, the depth of the investigation, and priority. While waiting for a full check to be completed, interim clearances can be granted within a few weeks of a security package being completed.

Reinvestigation

An initial security clearance may also take longer to receive and must be reinvestigated to maintain the clearance level. The higher the clearance level, the more often it will need to be reinvestigated—e.g., every five years for a top secret security clearance.

Summary of Security Clearance Types

Risk	Sensitivity	Classification	Clearance level	Initial clearance	Investigation requirements	Time to receive	Reinvestigation period
Low	Non-sensitive	Non-sensitive	-	- 18	National Agency Check With Inquiries (NACI) • Automated background check • Fingerprints	60 to 90 days	-
Moderate	Non-sensitive	Public Trust	-	-	Minimum Background Investigation, Limited Background Investigation, or Background Investigation • Automated background check • Fingerprints	60 to 90 days	-
High							
Low	Non-critical sensitive	National Security	Confidential	NACI	Access National Agency Check with Inquiries (ANACI) • Background check • Agency interview of people who have lived or worked with applicant in the past seven (or sometimes more) years • Past 10 years of residency • Foreign contacts • Credit checks • Polygraph (some)	90 days to one year	15 years
Moderate	Non-critical sensitive		Secret				10 years
High	Critical sensitive		Top Secret	Single-Scope Background Investigation			5 years
High	Special sensitive		Top Secret, Compartmented Information				5 years

Suitability Investigation

Once the security package is submitted, the applicant must undergo a suitability check. Suitability investigations inquire about a person's character traits and conduct to assess whether an individual's selection or continued employment would protect and maintain the integrity and efficiency of federal service. These investigations typically involve checking the applicant's background for prior substance use or substance use disorders as well as criminal, negligent, or dishonest conduct, especially as it relates to employment and an individual's integrity in performing a job. The Office of Personnel Management or the specific hiring agency can also make determinations about additional considerations for suitability, including but not limited to:

- The nature and seriousness of the conduct
- The circumstances surrounding the conduct
- The recency of the conduct and age of the individual at the time

The higher the security clearance requirement, the more in depth the suitability check will be.

Note on recreational marijuana use: Though marijuana is legal in Ohio, using marijuana is still against federal law. This allows recreational marijuana use to be considered along with other criminal conduct in an applicant's suitability for a job. For non-sensitive positions, employers cannot base suitability on past marijuana use alone.

Onboarding and Training

All new hires to DAF, and the wider U.S. Department of Defense, are required to complete the Total Force Awareness training requirements within the first 90 days of hire. This consists of several hours of computer-based training modules on various topics. Required training specific to the Defense Department includes Operations Security, Controlled Unclassified Information, and Cyber Awareness. These courses cover the safeguarding of sensitive information and use of encrypted IT systems.

Federal employees also have training covering the unique ethics rules they must follow regarding gift giving, fundraising, political activism, misuse of position, and financial investment.

Pay and Advancement

Many federal jobs use a salary grade system known as the General Schedule. The system has 15 grades (GS 1 through GS 15), each with 10 steps. The pay of each level depends on the level of difficulty, responsibility, and qualifications required. The specifics of the salary are determined by a base salary and locality adjustment, meaning positions at the same level may not pay the same in every location.

Most employees will begin at step one of the GS levels they are hired at and can move to the next step based on satisfactory performance and predetermined waiting periods that increase every three steps. Initial waiting periods between each step begin at Year 1 and end at Year 3. It takes approximately 18 years to advance through all 10 steps within one GS grade level. Under special circumstances or for outstanding performance, employees can also qualify for entrance at a higher step rate, quality step increases, or promotion to higher grades.

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