Montgomery County
Information Technology/Computer Science Pathway

MCESC Montgomery County Educational Service Center — Business Advisory Council

This framework outlines a common set of experiences for students in an information technology (IT)/computer science pathway from 8th grade through their future careers. It supports the alignment of regional business, higher education, K–12, and workforce outcomes to ensure that pathways prepare young people for careers with family-supporting wages and build a robust talent pipeline for employers. This is a living document that will need to be updated frequently to be up-to-date with 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
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

⊕ **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

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

These selected postsecondary credentials in IT/computer science, based on program options and transfer agreements at Sinclair Community College, lead to careers with family-supporting wages. 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	• CompTIA A+ • CompTIA IT Fundamentals+	• 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	• Computer Information Systems Bachelor of Science	• Computer Network Support Specialist • Computer User Support Specialist
	• CompTIA IT Fundamentals+ • CompTIA A+ • CCENT • Network+ • MTA	• 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.		• Network Administrator • Network Security Analyst • Network Engineer
	• CompTIA IT Fundamentals+ • MTA • CompTIA A+ • OCAJ	• Computer Information Systems—Software Development Associate of Applied Science Students eligible to take the Network+ certification exam		• Software Developer • Web Developer • Help Desk Analyst • Network Administrator • User Support Specialist • Network Security Analyst • Network Engineer
Cybersecurity: Prevention and Investigation Technology	• CompTIA IT Fundamentals+ • CompTIA A+ • MTA	• 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	• Information Technology and Cybersecurity Bachelor of Science	• Cybersecurity Analyst/Technician • Cyber Crime Analyst/Investigator • Incident Analyst/Responder • IT Auditor
	• CompTIA IT Fundamentals+	• 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		• Intelligence Analyst • IT Specialist • Systems Administrator • Network Engineer • Information System Security Manager • Cyber Security Incident Response Specialist • Private Investigator
Guided Transfer	• CompTIA IT Fundamentals+ • CompTIA A+ • CompTIA Security+	• Computer Science Associate of Science	• Computer Science Bachelor of Science	• 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 is from the MIT Living Wage Calculator for one adult and one child in Montgomery County. 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.

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

August 2021