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INFORMATION TECHNOLOGY & INFORMATION SECURITY CAREER PATHWAY

The work of the Talent Pipeline Task Force was inspired by our community's existing assets in the areas of education and workforce. Members consist of a diverse mix of employers, workforce development leaders, chambers of commerce, and postsecondary education and social service providers.

The Talent Pipeline Task Force – with grant support from Lumina Foundation – partnered with the Chicago-based Council on Adult and Experiential Learning (CAEL) to develop career pathways in core occupations and industries of high need in the three targeted sectors. The matching of education supply data and labor market needs were supported by CI:Now, CAEL, and SA2020.

Career pathways are designed from the ground up, with attention to foundational and essential skills at the entry level or in the early stages of the ladder. They also offer multiple entry and exit points, with the intent being that those who seek skills and a job in a pathway can do so while intentionally climbing an explicit career ladder.

Building on these career pathway documents, the Talent Pipeline Task Force recommends the following:

1) Embed career information into college advising; and
2) Align the messaging of K-12, higher education, workforce and community-based organizations, so that multiple audiences receive the same information about demand occupations and key entry points.

For more information and the full Talent Pipeline Task Force Report, visit www.SA2020.org/reports.

Information Technology & Information Security: Information

Software Publisher Job Family

Entry Points	Transition Points and Requirements		Wage Range
Bachelor and Above Level (Senior and Above)	Transition Requirements • Bachelors degree (some may require master's degree) • 2-8 year's experience (varies by occupation and company) • Certified Software Quality Engineer; Information System Analyst; Certified Software Quality Engineer	**Firmware Engineer** **Product Engineering Manager** **Software Engineer, Software Support** **Support Engineer** **Software Engineer** **Software Architect** **Web Producer** **Web Designer** **Webmaster**	$30,000-$135,000
Associate Level (Mid to Senior)	Qualifications • Associates degree, plus 0-2 years of related experience	**Drafter/Designer (CAD-CAM)**	$35,000-$55,000

FOUNDATIONAL SKILL SETS

Basic Math and Science Skills Multi-tasking Equipment Usage/Monitoring	Understanding of Electrical Circuits Highly Organized Computer Skills	Quality Control Analysis Knowledge of Hardware Operations Repairing and Testing	Mechanical Skills Attention to Detail Troubleshooting Skills

ESSENTIAL SKILL SETS

Punctual and Efficient Adaptable and Flexible Responsible	Drug-Free Able to work with teams Self-Motivated	Well-Groomed Able to communicate clearly Honesty and Integrity	Positive Attitude Conflict Resolution Self-Control

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Entry Points	Job Title	Job Description	Education/ Training	Wage Ranges
Bachelor and Above Level (Senior and Above)	Firmware Engineer	Designs, develops, implements and tests firmware systems and software embedded into hardware devices such as CPUs and broadband IP devices. Writes, troubleshoots and debugs code for embedded firmware. Utilizes knowledge of programming languages and embedded operating systems.	Bachelors degree in engineering and at least 3 years of related experience	$67,400-$104,300
	Product Engineering Manager	Oversees a project's design, development and evaluation. Manages the project's engineering staff.	An advanced degree in a technical discipline and at least 7 years of related experience.	$88,700-$133,800
	Software Architect	Constructs the software architecture and supervises a large technical staff. Guides and informs the software development process. Possesses a comprehensive understanding of programming languages, operating systems, industry trends and software design.	An advanced degree in a related area and at least 8 years of software development experience	$60,900-$99,700
	Software Engineer	Designs, develops and modifies computer applications, software systems, and technology solutions.	Bachelors or advanced degree in software engineering and 0-2 years related experience	$67,400-$104,300

	Software Engineer, Software Support	Designs and codes from specifications, analyzes, evaluates, tests, debugs, documents, and implements moderately complex software applications. Modifies, installs, and prepares technical documentation for system software applications. Monitors systems capacity and performance, plans and executes disaster recovery procedures, and provides Tier 2 technical support.	Bachelors degree in engineering; a masters degree in engineering is preferred	$67,400-$104,300
	Support Engineer	Act as intermediary between first-level technical support staff and engineers involved with design and development.	Bachelors degree in a technical discipline and 0-2 years related experience	$30,800-$46,800
	Web Designer	Designs, maintains and develops an organization's web catalogs and websites, including online applications, user interface, graphics and overall design. Tracks modifications made to the web structure. Helps fashion a website into a promotional or marketing tool.	Bachelors degree, and 2-4 years of related experience.	$46,000-$81,600
	Web Producer	Establishes the primary objectives of web products and cultivate an organization's online image. Sets project objectives, coordinates the work of the design and programming staff, and monitors and guides a web project throughout its lifecycle. Oversees the general website maintenance, including updates, edits and quality assurance testing.	An advanced degree in a related area and at least 3 years of related experience	$46,000-$81,600
	Webmaster	Oversees the overall performance of websites, client and server applications and intranet/internet systems. Evaluates, develops and maintains the websites' accessibility, user interface, content, appearance and efficiency.	Bachelors degree, and 2-6 years related experience.	$46,000-$81,600

Associate Level (Mid to Senior)	Drafter/Designer (CAD-CAM)	Uses Computer Aided Design (CAD) to produce blueprints, product component illustrations and other 3D models used in product design/development, publications, animation, and other visual applications	Associates degree in a design discipline and 0-2 years of related experience	$33,900-$55,000

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Information Technology & Information Security: Information

Data Processing, Hosting, and Related Services Job Family

Entry Points	Transition Points and Requirements		Wage Range
Bachelor and Above Level (Senior and Above)	Qualifications • Bachelors degree • Relevant work experience (ranges from 0-5; 2-7 years) • Certifications: Linux, Cisco, Microsoft Certified Information Technology Professional (MCITP); Certified Data Management Professional; Microsoft SQL	**Database Administrator Database Developer Database Analyst Database Engineer Hardware Analyst Software Analyst**	$45,000-$100,000

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Information Technology & Information Security: Manufacturing

Computer and Electronic Product Manufacturing Job Family

Entry Points	Transition Points and Requirements		Wage Range
Bachelor and Above Level (Senior and Above)	**Transition Requirements** • Bachelors Degree; minumum 2 years relevant work experience • Microsoft Certified Professional Developer; Certified Software Developer Associate; Certified Software Development Professional; IBM Certified Application Developer	**Computer Software Engineer, Systems Software** **Hardware Quality Assurance Analyst** **Support Engineer** **Computer Hardware Engineer** **Computer Software Engineer, Applications**	$35,000-$95,000
Associate Level (Mid to Senior)	**Transition Requirements** • Associates Degree • 0-2 years relevant experience • CAD, Electronic Engineering Cert.	**Drafter/Designer (CAD-CAM)** **Electrical and Electronic Engineering Technician**	$30,0000-$60,000
Entry Level/High School Diploma	**Qualifications** • High school diploma or equivalent • On the Job Training • Electrical Generator Systems Technician Certification; CP Technologist (advanced)	**Electrical and Electronic Equipment Assemblers**	$30,000-$40,000

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Entry Points	Job Title	Job Description	Education/ Training	Wage Ranges
Bachelor and Above Level (Senior and Above)	Computer Hardware Engineers	Research, design, develop, or test computer or computer-related equipment for commercial, industrial, military, or scientific use. May supervise the manufacturing and installation of computer or computer-related equipment and components.	Bachelors degree or an advanced degree in a technical discipline, and 0-2 years of related experience	$50,000-$71,000
	Computer Software Engineers, Applications	Develop, create, and modify general computer applications software or specialized utility programs. Analyze user needs and develop software solutions. Design software or customize software for client use with the aim of optimizing operational efficiency. May analyze and design databases with an application area, working individually or coordinating database development as part of a team.	Bachelors degree; Masters degree may be required for some companies	$94,000
	Computer Software Engineers, Systems Software	Research, design, develop and test operating systems-level software, compilers, and network distribution software for communications and computing applications. Set operational specifications and formulate and analyze software requirements. May design embedded systems software.	Bachelors degree; Masters degree may be required for some companies	$90,000
	Hardware Quality Assurance Analyst	Monitors the production process and inspects computer hardware before its distribution. Conducts virtual and physical stress tests of hardware equipment. Troubleshoots design flaws, reports findings and may take recommendations for improvements and modifications. Assists in research, development and testing of new electrical and electronic products.	Bachelor's degree and 0-2 years related experience.	$36,000-$56,000
	Support Engineer	Act as intermediary between first-level technical support staff and engineers involved with design and development.	Bachelor's degree in a technical discipline and 0-2 years of related experience.	$59,000-$88,000

Associate Level (Mid to Senior)	Drafter/Designer (CAD-CAM)	Uses Computer Aided Design Software (CAD) to produce blue prints, product component illustrations and other 3D models used in product design/development, publications, animation and other visual applications.	Associates degree, and 0-2 years of related experience	$31,000-$40,000
	Electrical and Electronic Engineering Technicians	Assist with the design and development of computers, communications equipment, medical monitoring devices, navigational equipment, and other equipment. Involved in product evaluation and testing, using measuring and diagnostic devices to adjust, test, and repair equipment.	Associates degree, and 0-2 years of related experience	$58,000
Entry Level/High School Diploma	Electrical and Electronic Equipment Assemblers	Assemble or modify electrical or electronic equipment, such as computers, test equipment telemetering systems, electric motors, and batteries. Read and interpret schematic drawings, diagrams, blueprints, specifications, work orders, or reports to determine materials requirements or assembly instructions.	High school diploma or equivalent, plus relevant experience.	$34,000

Information Technology & Information Security: Repair and Maintenance

Electronic and Precision Equipment Repair and Maintenance Job Family

Entry Points	Transition Points and Requirements		Wage Range
Bachelor and Above Level (Senior and Above)	Transition Requirements • Bachelors Degree • 3-5 years experience	**Deployment Engineer**	$45,000-$65,000
Associate Level (Mid to Senior)	Transition Requirements • Associates Degree • Cisco Certified Entry Networking Technician (CCENT); CompTIA Network+; The Certified Novell Engineer; Certified Electronics Systems Technician	**Computer Repair Technician** **Electronics Engineering Technician** **Network Technician**	$60,000-$70,000
Certificate Level (Entry to Mid)	Transition Requirements • Post-secondary certificate, plus OJT • Certified Electronic Systems Technician; Wireless Installer Engineer; ITS Design Fundamentals	**Electrical and Electronics Repairers** **Telecommunications Equipment Installers & Repairers**	$45,000-$66,000
Entry Level/High School Diploma	Qualifications • High school diploma or equivalent; 1-2 years relevant work experience; OJT	**Technical Support Specialist \ Help Desk Technician** **Cloud Sites Support Technician I**	$30,000-$40,000

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Information Technology & Information Security: Scientific and Technical

Computer Systems Design and Related Services Job Family		
Entry Points	**Transition Points and Requirements**	**Wage Range**
Bachelor and Above Level (Senior and Above)	**Transition Requirements** • Bachelors or Masters Degree, depending on occupation • Minimum 3 years experience • Certified Software Quality Engineer; Certified Network Systems Technician; Information System Analyst; CISCO certifications; Database Design Specialists; Certified Data Management Professional; CIW Web Development Professional **Computer Systems Architect** **Software Developers, Systems Software** **Computer Network Architect** **Database Administrator** **Software Developers, Applications** **Computer and Information Systems Managers** **Computer and Information Research** **Computer Hardware Engineer** **Scientists** **Network and Computer Systems** **Computer Programmer** **Administrators**	$70,000-$120,000
Associate Level (Mid to Senior)	**Transition Requirements** • Associates degree; OJT • Certified Software Quality Engineer; Certified Network Systems Technician; Information System Analyst; CISCO certifications **Computer Systems Analyst** **Computer User Support Specialist**	$45,000-$65,000
Certificate Level (Entry to Mid)	**Qualifications** • Vocational training, post-secondary certificate; OJT **Computer Operator**	$30,000-$40,000

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Entry Points	Job Title	Job Description	Education/ Training	Wage Ranges
Bachelor and Above Level (Senior and Above)	Computer Hardware Engineer	Research, design, develop, or test computer or computer-related equipment for commercial, industrial, military, or scientific use. May supervise the manufacturing and installation of computer or computer-related equipment and components.	Bachelors (may require masters degree)*	$81,000
	Computer Network Architect	Design and implement computer and information networks, such as local area networks (LAN), wide area networks (WAN), intranets, extranets, and other data communications networks. Perform networking modeling, analysis and planning. May also design network and computer security measures.	Bachelors degree, plus 5 years work related experience	$100,000
	Computer and Information Systems Managers	Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming. Develop computer information resources, providing data security and control, strategic computing, and disaster recovery.	Bachelors degree, plus 5 years work related experience; some may require Masters degree	$120,000
	Computer and Information Research Scientists	Conduct research into fundamental computer and information science as theorists, designers, or inventors. Develop solutions to problems in the field of computer hardware and software.	Masters degree	$102,000
	Computer Programmers	Create, modify, and test the code, forms, and script that allow computer applications to run. Work from specifications drawn up by software developers or other individuals. May assist software developers by analyzing user needs and designing software solutions. May develop and write computer programs to store, locate, and retrieve specific documents, data and information.	Bachelors degree	$75,000

	Computer Systems Architect	Design, construct, and maintain the data systems that organizations use to help drive communication and productivity. These systems include local and wide area networks, intranets, voice and audio sharing networks and virtual network interfaces.	Bachelors degree, plus minimum 3 years relevant work experience	$90-$100,000
	Database Administrators	Administer, test, and implement computer databases, applying knowledge of database management systems. Coordinate changes to computer databases. May plan, coordinate, and implement security measures to safeguard computer databases.	Bachelors degree	$78,000
	Network and Computer Systems Administrators	Install, configure and support local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. May monitor and test website performance, assist in network modeling, analysis, planning, and coordination between network communications hardware and software.	Bachelors degree	$60,000-$70,000
	Software Developers, Applications	Develop, create, and modify general computer applications software or specialized utility programs. Analyze user needs and develop software solutions. Design software or customize software for client use with aim of optimizing operational efficiency. May analyze and design databases within an application area, working individually or coordinating database development as part of a team.	Bachelors Degree, plus several years of work related experience, OJT	$85,000-$95,000
	Software Developers, Systems Software	Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications.	Bachelors Degree, plus several years of work related experience, OJT	$93,000

Associate Level (Mid to Senior)	Computer Systems Analysts	Test, maintain, and monitor computer programs and systems, including coordinating the installation of computer programs and systems. Provide staff and users with assistance solving computer related problems, such as malfunctions and program problems. Review and analyze computer printouts and performance indicators to locate code problems, and correct errors by correcting codes.	Associates degree	$63,000
	Computer User Support Specialist	Provide technical assistance to computer users; answer questions or resolve computer problems for clients in person, or via telephone or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and systems.	Post-secondary certificate, related OJT, or an Associates Degree	$45,000
Certificate Level (Entry to Mid)	Computer Operator	Monitor and control electronic computer and peripheral electronic data processing equipment to process business, scientific, engineering, and other data according to operating instructions. Monitor and respond to operating and error messages. May enter commands at a computer terminal and set controls on computer and peripheral devices.	Vocational school training, related OJT, or Associates	$38,000