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 in 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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade 9 and 10</th>
<th>Grade 11</th>
<th>Grade 12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Information Technology</td>
<td>Networking Programming</td>
<td>Strategic CFP Course such as:</td>
</tr>
<tr>
<td></td>
<td>Foundational IT/Comp Sci or CCP</td>
<td>Networking Fundamentals</td>
<td>CIS 1305-Information Systems Analysis and Design</td>
</tr>
<tr>
<td></td>
<td>cis 1907-Introduction to Operating Systems</td>
<td>CIS 1111-Introduction to Problem Solving and Computer Programming</td>
<td>Note: College Credit Plus students receive both high school and postsecondary requirements, saving students time and money. Students who complete the following core course can earn the IT Fundamentals Certificate in Sinclair Community College: BS 1120, BS 1170, BS 1180, BS 1140, BS 2365</td>
</tr>
</tbody>
</table>

### 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 to succeed in a particular career in information technology and computer science.

### Work-Based Learning

<table>
<thead>
<tr>
<th>Career Exploration</th>
<th>Career Adventurers Career Fair</th>
<th>Work-Site Tours</th>
<th>Power Lunches</th>
<th>Pathway Fairs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Advising

<table>
<thead>
<tr>
<th>YTOCC</th>
<th>Youth Transition Office for College Career</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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 Engineering
  - Word Processing, Spreadsheet, and Presentation Software

- **IT/Computer Science Technical Competencies**
  - Principles of Data and Software Design
  - Principles of Software Design
  - Security, Compliance, and Risk Management
  - Routing and Network Configurations
  - Fundamentals of Cloud Computing and Virtualization
  - Individualized Specialization

- **College and Career Signing Day**

- **College Application Prep Work**

- **Career Planning:**
  - Internship
  - Career Fair
  - Mock Interview

- **Exposure to Related Careers:**

- **Community College:**
  - College Information Systems—Computer Engineering
  - Computer Information Systems—Network Engineering
  - Computer Information Systems—Network Engineering
  - Computer Information Systems—User Support
  - Computer Information Systems—Web Design

- **University:**
  - Bachelor’s or Higher*

- **High School:**
  - 2,129

- **STEM:**
  - 5+ Years

### Selected Postsecondary Options

<table>
<thead>
<tr>
<th>Computer Information Technology</th>
<th>Potential Initial Credential</th>
<th>Stackable Credentials</th>
<th>Typical Occupational Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Computer IT Fundamental+</td>
<td>Computer IT Fundamental+</td>
<td>Computer Information Systems—User Support Associate of Applied Science</td>
</tr>
<tr>
<td></td>
<td>Computer IT Fundamental+</td>
<td>Computer IT Fundamental+</td>
<td>Computer Information Systems—Network Engineering Associate of Applied Science</td>
</tr>
<tr>
<td></td>
<td>Computer IT Fundamental+</td>
<td>Computer IT Fundamental+</td>
<td>Information Technology and Cybersecurity Bachelor of Science</td>
</tr>
</tbody>
</table>

- **Cybersecurity:**
  - Information Technology and Cybersecurity Bachelor of Science
  - Computer Information Systems—Secure System Administration Associate of Applied Science

- **Software Development:**
  - Software Developer
  - Web Developer
  - Help Desk Analyst

- **Network Administration:**
  - Network Administrator
  - Help Desk Analyst

- **Employability:**
  - Career Planning:
    - Internship
  - Career Fair

- **Exposure to Related Careers:**

- **Community College:**
  - College Information Systems—Network Engineering
  - Computer Information Systems—Network Engineering
  - Computer Information Systems—User Support
  - Computer Information Systems—Web Design

- **University:**
  - Bachelor’s or Higher*

- **High School:**
  - 2,129

- **STEM:**
  - 5+ Years

### 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 gap; changes in these pay gaps reflect 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 (2020)” 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.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Entry Level (2020)</th>
<th>Bachelor’s Degree or Higher (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Developer</td>
<td>4,441</td>
<td>26%</td>
</tr>
<tr>
<td>Systems Engineer</td>
<td>4,209</td>
<td>23%</td>
</tr>
<tr>
<td>Information Technology Officer</td>
<td>3,960</td>
<td>12%</td>
</tr>
<tr>
<td>Director IT Director</td>
<td>3,742</td>
<td>5%</td>
</tr>
<tr>
<td>Help Desk Analyst</td>
<td>3,608</td>
<td>32%</td>
</tr>
<tr>
<td>Information Security Officer</td>
<td>3,315</td>
<td>27%</td>
</tr>
<tr>
<td>Network Administrator</td>
<td>3,171</td>
<td>40%</td>
</tr>
<tr>
<td>Systems Administrator</td>
<td>3,119</td>
<td>36%</td>
</tr>
<tr>
<td>Network Designer</td>
<td>3,013</td>
<td>26%</td>
</tr>
<tr>
<td>Web Designer</td>
<td>2,880</td>
<td>10%</td>
</tr>
</tbody>
</table>

*National data

This document was developed by IFP, 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