



## Scope and Sequence Curriculum Outline

**Career Program:** Information Technology I

**DOE Code:** 5230

**Career Cluster:** Information Technology

**Recommended Grade Levels:** 11, 12

**Prerequisites:** None

**High School Credits:** 3 per semester (6 total per school year)

**Additional Information:** Counts as a Directed Elective or Elective for the General, Core 40, Academic Honors and Technical Honors diplomas

**Program Description:** Information Technology I allows students to explore how computers work. Students learn the functionality of hardware and software components as well as suggested best practices in maintenance and safety issues. Through hands on activities and labs, students learn how to assemble and configure a computer, install operating systems and software, and troubleshoot hardware and software problems.

**Alignment:** Indiana Department of Education Academic Standards Course Framework; CompTIA A+, MTA 98-349, and TestOut PC Pro certification; Ivy Tech Community College and Vincennes University (dual credit agreements); and *Authorized Cert Guide CompTIA A+* (Pearson) and *Mike Meyers Managing and Troubleshooting PCs Lab Manual* curriculum materials (McGraw-Hill)

**Companion Documents:** WCC Information Technology I Program Syllabus; WCC High School Pathway Plan; WCC Program Description Guide

### Curriculum Content Summary:

- Hardware
- Troubleshooting, Repair, and Maintenance
- Operating Systems and Utilities
- Networking
- Security
- Employability and Operational Procedures
- Problem Analysis/Software Tools/Algorithm

Content	Indiana DOE Standards	Knowledge & Skills <small>(based on instructional materials)</small>	Example Activities	Time Frame	Evaluation / Certification
<p><b>DOMAIN</b> <b>Hardware</b></p> <p><b>Core Standard I</b> Students synthesize hardware and peripheral concepts critical to the design of a working computer system</p>	<p><b>CTS-1.1</b> Identify the fundamental components of using personal computers including the identification and function of storage devices, motherboards, power supplies, processors, memory, display devices, input devices, adaptor cards, ports, and cooling systems</p> <p><b>CTS-1.2</b> Install, configure, optimize and upgrade personal computer components including storage devices, display devices, and basic input and multimedia devices</p> <p><b>CTS-1.3</b> Identify the fundamental principles of using laptops and portable devices including form factors, peripherals, expansion slots, ports, communication connections and input devices</p> <p><b>CTS-1.4</b> Install and configure printers and scanners</p> <p><b>CTS-1.5</b> Describe processes used by printers and scanners including laser, ink dispersion, thermal, solid ink and impact printers and scanners</p>	<ul style="list-style-type: none"> <li>• Identify the most important features of desktop and laptop computers and where to find more information.</li> <li>• Understand how hardware, software, and firmware work together</li> <li>• Discover how component failures can affect a system</li> <li>• Identify what’s “under the hood” of existing systems that might be candidates for customized PC configurations</li> <li>• Install or replace existing multimedia hardware</li> <li>• Discover options such as ExpressCard, PC Card, CardBus, memory and card readers</li> <li>• Identify how to keep laptop components organized and prevent damage during disassembly</li> <li>• Remove and replace hard drives, memory, batteries, Wi-Fi radio cards, screen assemblies, processors, and more</li> <li>• Describe the basics of laser, inkjet, thermal, and impact printers</li> <li>• Demonstrate how to install printers properly, upgrade RAM and firmware, select ports, configure, Windows options, and use the Print Spooler service</li> </ul>	<ul style="list-style-type: none"> <li>• Disassemble/assemble computers</li> <li>• Authorized Cert A+ guide Ch. 1 lab 1-1 and lab 1-2</li> <li>• Mike Meyer’s lab manual exercises</li> <li>• TestOut PC Pro</li> <li>• Identify motherboard components lab</li> <li>• Authorized Cert A+ guide lab 11-1: Solve inkjet printing problems</li> <li>• Disassemble/assemble laptops</li> <li>• Authorized Cert A+ guide Ch. 9 lab 9-1</li> </ul>	<p>7 weeks</p> <p>Reinforced throughout the year</p>	<ul style="list-style-type: none"> <li>• A+ Guide chapter review questions</li> <li>• A+ Guide chapter tests</li> <li>• TestOut PC Pro labs and certification</li> <li>• Weekly participation</li> <li>• Dual credit</li> </ul>

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<p><b>DOMAIN</b> Troubleshooting, Repair, and Maintenance</p> <p><b>Core Standard 2</b> Students validate practical skills for managing personal computers</p>	<p><b>CTS-2.1</b> Apply and adapt troubleshooting methodologies and its relationship to the scientific Method</p> <p><b>CTS-2.2</b> Perform preventative maintenance on personal computer components including visual and audio inspection, driver and firmware updates, scheduling, use of appropriate repair tools and cleaning materials, and environmental factors</p> <p><b>CTS-2.3</b> Identify tools, diagnostic procedures and troubleshooting techniques for personal computer components</p> <p><b>CTS-2.4</b> Perform preventative maintenance of networks including securing and protecting network cabling</p> <p><b>CTS-2.5</b> Identify tools, basic diagnostic procedures and troubleshooting techniques for laptops and portable devices including power conditions, video, keyboard, pointer and wireless card issues</p> <p><b>CTS-2.6</b> Perform preventative maintenance on laptops and portable devices including cooling devices, hardware and video cleaning materials, operating environments, storage, transportation and shipping</p> <p><b>CTS-2.7</b> Identify tools, diagnostic procedures, troubleshooting, and maintenance techniques for computer security</p> <p><b>CTS-2.8</b> Identify tools, diagnostic procedures and troubleshooting techniques for operating systems including boot sequences, recognize and resolve common operational issues, explain common error messages and codes and operating system utilities</p> <p><b>CTS-2.9</b> Perform preventative maintenance on operating systems by using common utilities, updates, scheduled backups, and restore points</p> <p><b>CTS-2.10</b> Apply command-line functions and utilities to manage operating system, including proper syntax and switches</p> <p><b>CTS-2.11</b> Identify, isolate and resolve printer/scanner problems including defining the cause, applying the fix and verifying functionality</p>	<ul style="list-style-type: none"> <li>• Discover what a BSOD is, typical causes, how to diagnose on, and how to specify whether a system restarts if a BSOD occurs or stays on</li> <li>• Identify what causes boot failures and how to restore an unbootable system back to operation</li> <li>• Identify what Windows tools and features you can use to find the cause and solve the problem</li> <li>• Locate System File Checker, Defrag, Registry Editor, Recovery Console, Windows Recovery Environment, and other Windows features designed for troubleshooting and repair</li> <li>• Schedule and perform Windows best practices to help a system run reliably</li> <li>• Use command-line utilities</li> <li>• Utilize command-line tools</li> </ul>	<ul style="list-style-type: none"> <li>• Troubleshoot PCs in lab</li> <li>• Repair PCs</li> <li>• Mike Meyer's lab manual exercises</li> <li>• TestOut PC Pro</li> </ul>	<p>7 weeks</p> <p>Reinforced throughout the year</p>	<ul style="list-style-type: none"> <li>• A+ Guide chapter review questions</li> <li>• A+ Guide chapter tests</li> <li>• Troubleshooting scenarios test</li> <li>• TestOut PC Pro labs and certification</li> <li>• Weekly participation</li> <li>• Dual credit</li> </ul>

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<p><b>DOMAIN</b> Operating Systems and Utilities</p> <p><b>Core Standard 3</b> Students integrate software skills and troubleshooting utilities to manage reliable computer systems</p>	<p><b>CTS-3.1</b> Identify the fundamentals of using operating systems as defined by the operating system's name, purpose, and characteristics of the operating system components including registry, virtual memory and file system</p> <p><b>CTS-3.2</b> Install, configure, optimize and upgrade operating systems</p> <p><b>CTS-3.3</b> Install, configure, optimize and upgrade laptops and portable devices including power management and peripherals</p> <p><b>CTS-3.4</b> Install, configure, optimize and upgrade virtual machines</p>	<ul style="list-style-type: none"> <li>• Identify the steps involved in preparing for and performing a full, upgrade, or multiboot installation of Windows, including minimum requirements, installation types, installation options, source media options, disk partitions, file systems, and alternative drivers</li> <li>• Identify what methods are used to bring an installation of Windows up to date</li> <li>• Understand the basics of the virtual machine revolution</li> </ul>	<ul style="list-style-type: none"> <li>• Install OS on lab computers</li> <li>• Mike Meyer's lab manual exercises</li> <li>• TestOut PC Pro</li> </ul>	<p>2 weeks</p> <p>Reinforced throughout the year</p>	<ul style="list-style-type: none"> <li>• A+ Guide chapter review questions</li> <li>• A+ Guide chapter tests</li> <li>• TestOut PC Pro labs and certification</li> <li>• Weekly participation</li> <li>• Dual credit</li> </ul>

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<p><b>DOMAIN</b> Networking</p> <p><b>Core Standard 4</b> Students evaluate networking concepts to build and maintain an operational network</p>	<p><b>CTS-4.1</b> Identify names, purposes and characteristics of basic network protocols and Terminologies</p> <p><b>CTS-4.2</b> Install, configure optimize and upgrade networks</p> <p><b>CTS-4.3</b> Summarize the basic networking fundamentals including technologies devices and Protocols</p> <p><b>CTS-4.4</b> Categorize network cables and connectors and their implantations</p> <p><b>CTS-4.5</b> Differentiate different network types</p>	<ul style="list-style-type: none"> <li>• Define the client/server and peer-to-peer networking models and explain the difference between the two</li> <li>• Demonstrate how to install modems</li> <li>• Identify the basics about the Transmission Control Protocol/Internet Protocol (TCP/IP) suite</li> <li>• Identify the difference between TCP and UDP</li> <li>• Define twisted pair cable, coaxial, and fiber-optic</li> <li>• Define various tools used</li> <li>• Identify the different types of wired network technologies</li> <li>• Identify wireless networking standards</li> <li>• Difference between a hub and a switch</li> <li>• Install and configure network interface cards</li> <li>• Use network command-line tools</li> <li>• Troubleshoot in the event of a network failure or loss of access to resources and printers</li> </ul>	<ul style="list-style-type: none"> <li>• Make Ethernet cables</li> <li>• Binary conversion assignment</li> <li>• Mike Meyer’s lab manual exercises</li> <li>• TestOut PC Pro</li> </ul>	<p>5 weeks</p> <p>Reinforced throughout the year</p>	<ul style="list-style-type: none"> <li>• A+ Guide chapter review questions</li> <li>• A+ Guide chapter tests</li> <li>• Network cable quiz</li> <li>• TestOut PC Pro labs and certification</li> <li>• Weekly participation</li> <li>• Dual credit</li> </ul>

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<p><b>DOMAIN Security</b></p> <p><b>Core Standard 5</b> Students analyze security threats to ensure the health of the network</p>	<p><b>CTS-5.1</b> Identify the fundamental principles of security including names, purposes, and characteristics of hardware and software security, wireless security, and data security</p> <p><b>CTS-5.2</b> Install, configure, upgrade, and optimize security for hardware, software, and data</p>	<ul style="list-style-type: none"> <li>• Discuss the mindset you should have when securing a computer. File systems, authentication, and how to protect against malware</li> <li>• Describe encryption types, the Local Security Policy, backups, and password management</li> <li>• Discuss wireless encryption and maximizing security on wireless devices</li> <li>• Secure wired Ethernet networks from intruders and eavesdroppers</li> <li>• Demonstrate how to recycle, dispose of, or destroy hard drives and other data storing devices</li> <li>• Secure the BIOS, configure a firewall, and set up a secure wireless connection</li> </ul>	<ul style="list-style-type: none"> <li>• Listing vulnerabilities worksheet</li> <li>• Research exploit written worksheet</li> <li>• Probability matrix worksheet</li> <li>• Mike Meyer's lab manual lab exercises</li> <li>• TestOut PC Pro</li> </ul>	<p>4 weeks</p> <p>Reinforced throughout the year</p>	<ul style="list-style-type: none"> <li>• A+ Guide chapter review questions</li> <li>• A+ Guide chapter tests</li> <li>• TestOut PC Pro labs and certification</li> <li>• Weekly participation</li> <li>• Dual credit</li> </ul>

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<p><b>DOMAIN</b> Employability and Operational Procedure</p> <p><b>Core Standard 6</b> Students apply customer service concepts to be effective computer technicians</p>	<p><b>CTS-6.1</b> Describe the aspects and importance of safety and environmental issues, safe work environments, equipment handling, and disposal of equipment</p> <p><b>CTS-6.2</b> Employ good communication skills including listening and tact/ discretion when communicating with customers and colleagues</p> <p><b>CTS-6.3</b> Employ job-related professional behavior including notation of privacy, confidentiality, and respect for the customer and customers' property</p>	<ul style="list-style-type: none"> <li>• Demonstrate how to prevent electrostatic discharge (ESD) and work safely with computers</li> <li>• Identify how to control the environment and protect against issues that are out of your control</li> <li>• Demonstrate how to talk to and treat customers, focusing on respect for the customer</li> </ul>	<ul style="list-style-type: none"> <li>• Practice being a technician</li> <li>• Authorized Cert A+ guide Ch. 18 lab 18-1</li> <li>• Mike Meyer's lab manual lab exercises</li> <li>• TestOut PC Pro</li> <li>• NTHS</li> <li>• Student ambassadors</li> <li>• Guest speakers</li> <li>• Field trips</li> </ul>	<p>2 weeks</p> <p>Reinforced throughout the year</p>	<ul style="list-style-type: none"> <li>• A+ Guide chapter review questions</li> <li>• A+ Guide chapter tests</li> <li>• TestOut PC Pro labs and certification</li> <li>• Essential Skills Evaluation</li> <li>• Technical Skills Evaluation</li> <li>• Weekly participation</li> <li>• Work Ethic Certification</li> </ul>

**Additional content from Computer Science I (Core Standards 1-3; 4-6 are included in Information Technology II)**

Content	Indiana DOE Standards	Knowledge & Skills <small>(based on instructional materials)</small>	Example Activities	Time Frame	Evaluation / Certification
<p><b>DOMAIN</b> Problem Analysis/Software Tools/Algorithm</p> <p><b>Core Standard 1</b> Students analyze problem and develop a solution by creating a computer program</p> <p><b>Core Standard 2</b> Students apply and adapt software tools to develop a computer program</p> <p><b>Core Standard 3</b> Students design a solution to the problem using algorithms.</p>	<p><b>CP1-1.1</b> Identify how to use a computer program to solve a problem</p> <p><b>CP1-1.2</b> Construct interactive computer programs that accept various forms of input and produce various forms of output, as a solution to a computer programming problem</p> <p><b>CP1-1.3</b> Use print charts, file layouts, program narratives, hierarchy charts, and system flowcharts, which accurately depict the problem assigned and describe the solution</p> <p><b>CP1-1.4</b> Report the program schematics and usage</p> <p><b>CP1-1.5</b> Identify the standard program flowchart symbols and use them correctly within the context of the basic control structures of sequence, selection and looping</p> <p><b>CP1-2.1</b> Construct a program that processes information</p> <p><b>CP1-2.2</b> Identify programming languages as procedural or object oriented</p> <p><b>CP1-2.3</b> Develop programs using reusable modules (modularization)</p> <p><b>CP1-2.4</b> Use debugging techniques to correct and validate the computer program</p> <p><b>CP1-2.5</b> Construct the program in a high-level programming language based on a created design</p> <p><b>CP1-2.6</b> Construct a program that opens and closes a file</p> <p><b>CP1-3.1</b> Develop algorithms to solve a computer programming problem(s)</p> <p><b>CP1-3.2</b> Assess the use of algorithms to provide a solution to a programming problem</p> <p><b>CP1-3.3</b> Use pseudo code to describe a solution to a programming problem</p> <p><b>CP1-3.4</b> Create a problem flowchart and ANSI standard flowcharting symbols to define a solution to a programming problem</p> <p><b>CP1-3.5</b> Explain how the algorithm can be used to solve a problem</p>	<ul style="list-style-type: none"> <li>• Identify how computers store data</li> <li>• Identify how a program works</li> <li>• Design a Program</li> <li>• Describe Input, Processing, and Output</li> <li>• Displaying Output with the print function</li> <li>• Describe Comments</li> <li>• Describe Variables</li> <li>• Describe Reading Input from the Keyboard</li> <li>• Perform Calculations</li> <li>• Describe Data Output</li> <li>• Describe the IF Statement</li> <li>• Describe the IF-ELSE Statement</li> <li>• Discuss Comparing Strings</li> <li>• Learn about Nested Decision Structures and the IF-ELSE-IF Statement</li> <li>• Discuss Logical Operators</li> <li>• Discuss Boolean Variables</li> <li>• Introduce repetition structures</li> <li>• Describe the While Loop: A Condition-Controlled Loop</li> <li>• Describe the For Loop: A Count-Controlled Loop</li> <li>• Calculate a Running Total</li> <li>• Discuss Sentinels</li> <li>• Discuss Input Validation Loops</li> <li>• Discuss Nested Loops</li> <li>• Introduce Functions</li> <li>• Discuss Defining and Calling a Void Function</li> <li>• Design a program to use Functions</li> <li>• Discuss Local Variables</li> <li>• Discuss Passing Arguments to Functions</li> <li>• Discuss Global Variables and Global Constants</li> <li>• Introduce Value-Returning Functions: Generating Random Numbers</li> <li>• Discuss Writing your own Value-Returning Functions</li> <li>• Discuss The Math Module</li> <li>• Discuss Storing Functions in Modules</li> <li>• Demonstrate File Input and Output</li> <li>• Discuss using Loops to Process Files</li> <li>• Discuss how to Process Records</li> <li>• Discuss Exceptions</li> </ul>	<ul style="list-style-type: none"> <li>• Python Programming, including:             <ul style="list-style-type: none"> <li>○ Decision structures and Boolean logic</li> <li>○ Repetition structures</li> <li>○ Functions</li> <li>○ Files and exceptions</li> <li>○ Calculations</li> </ul> </li> </ul>	<p>9 weeks</p>	<ul style="list-style-type: none"> <li>• Python chapter review questions</li> <li>• Python chapter tests</li> <li>• Weekly participation</li> </ul>