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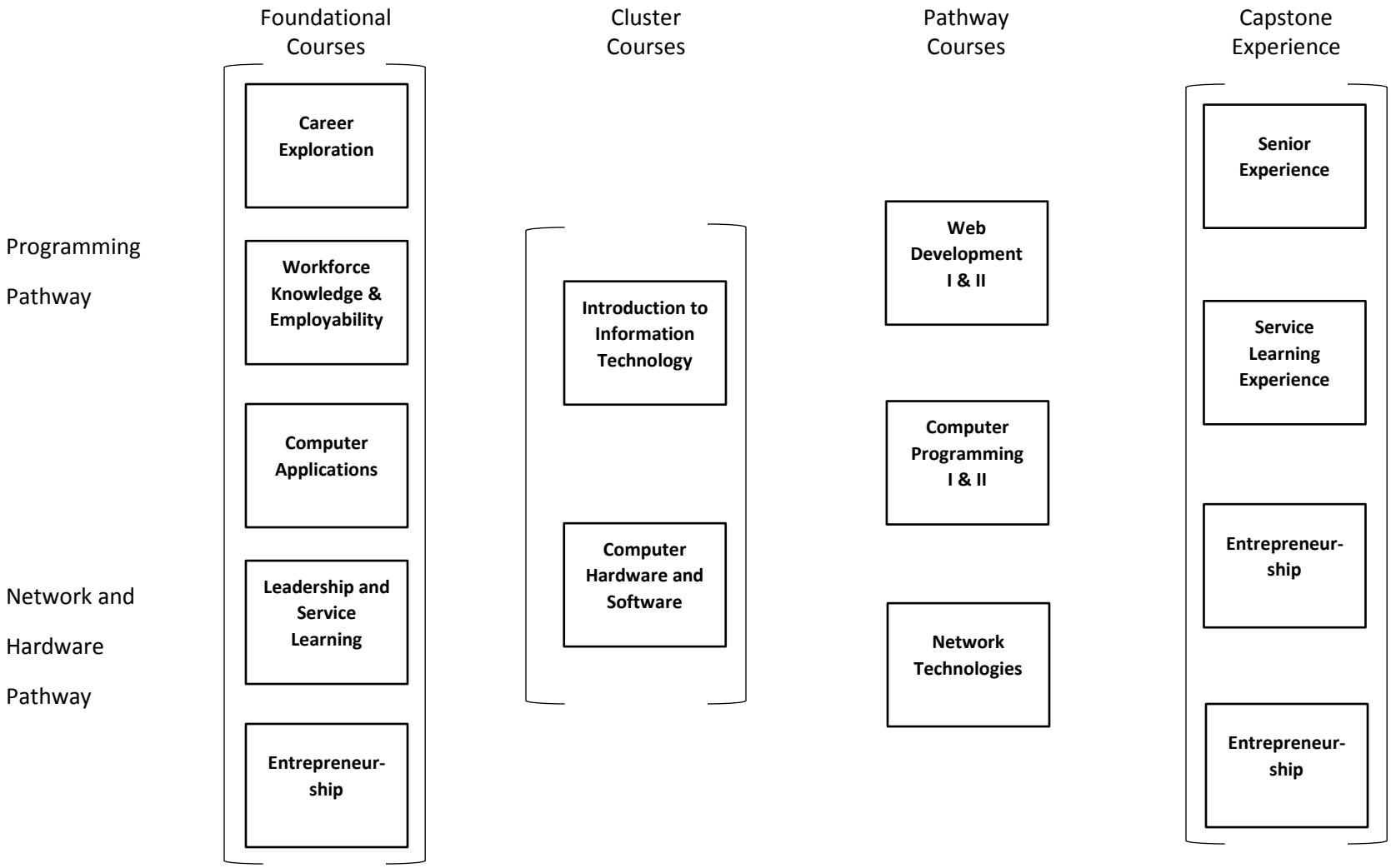
Information Technology Pathways



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Introduction to Information Technology

Career Cluster	Information Technology
Course Code	10009
Prerequisite(s)	Recommended that a student has taken from the Foundation Courses Computer Applications.
Credit	.5
Program of Study and Sequence	Intro to Information Technology is recommended as a prerequisite for two career pathways in the Information Technology: 1) Programming; 2) Networking and Hardware.
Student Organization	SkillsUSA
Coordinating Work-Based Learning	Tours, Guest Speakers, Job Shadowing
Industry Certifications	None
Dual Credit or Dual Enrollment	TBD
Teacher Certification	K-12 Educational Technology; K-12 Classroom Technology
Resources	

Course Description:

Introduction to Information Technology prepares students with knowledge and background of technology careers, programming, and hardware. This course explores new and emerging technologies for both professional and personal use.

Program of Study Application

Introduction to Information Technology is recommended as a prerequisite for two pathways: Programming and Networking & Hardware.

Course Standards

Indicator # IT 1. Understand the need and impact of technology.

Webb Level	*Sub-indicator*	*Integrated Content*
One	IT 1.1 Define the relationship between electronic devices and computers Example: • List electronic devices that you have used in the last two weeks and how those devices synchronize with computer technology	
One	IT 1.2 Describe the functional areas in which computers assist people. Example: • Explain how computers can assist people • Research artificial intelligence • Research the impact of social networking through the Internet • Explain how technology impacts our entertainment	
One	IT 1.3 Describe how technology is impacting community Examples: • Research how technology connects people • List ways in which etiquette plays a role in technology and communication • Research flash mobs and how technology assist this activity	
One	IT 1.4 List physical and mental health dangers associated with computer use Examples: • Research physical health concerns caused by technology usage • Research mental health and addiction caused by technology usage • Explain what can be done to avoid health problems	

Notes:

Indicator # IT 2. Understand computer hardware required to meet specific needs.

Webb Level	*Sub-indicator*	*Integrated Content*
One	IT 2.1 Understand how computer information is represented. Examples: • Explain how computers represent data • Research the history of binary and machine language • Convert decimal to binary and binary to decimal	
One	IT 2.2 Identify hardware components and their relationship to computer usage. Examples: • Research hardware requirements for five top pieces of software • Identify input, output, storage, and processing devices • List the computing and hardware needs for your future information technology career	
Two	IT 2.3 Understand different types of memory and storage Examples: • Explain differences between volatile and non-volatile memory • Explain differences between magnetic, optical and solid state storage	
One	IT 2.4 Identify input and output devices to meet the needs of users Examples: • Identify input devices and how they connect to the computer • Identify output devices and how they connect to the computer • Explain how input and output devices can help individuals with disabilities • Research new ideas for input and output devices	

Two	IT 2.5 Understand the decision-making process involved in purchasing computer systems Examples: • Identify a need the computer might solve. • Research minimum requirements for software and usage of the computer • Research cost of computers at different computer stores to meet the needs of low, middle, and high end users.	

Notes:

Indicator # IT 3. Understand software solutions for personal and professional use.

Webb Level	*Sub-indicator*	*Integrated Content*
Two	IT 3.1 Explain how software is created, distributed, installed, and maintained. Examples: • Explain the difference between system and application software and list examples of each. • List the steps to the software development process • Research different types of programming languages and identify their differences and what they are used for • Discuss software copyright and licensing issues • Explain the impact that Freeware, Open-Source Software, and Alternative Licensing has on software development	
One	IT 3.2 Describe the functions of system software and operating systems Examples: • Explain the purpose for system software • List major operating systems and their features	
Two	IT 3.3 Describe different types and purposes of productivity software Examples: • List popular productivity software and its manufacturer • Identify what software is needed for different careers • Research artificial intelligence software • Explain the Turing Test	

Notes:

Indicator # IT 4. Understand technology used for the Internet.

Webb Level	*Sub-indicator*	*Integrated Content*
One	IT 4.1 Describe how the Internet developed Examples: • Research the history of the Internet • List major Internet milestones	
One	IT 4.2 Explain how hardware, protocols, and software work together to create the Internet Examples: • Identify hardware used within the Internet infrastructure • Identify key Internet protocols and how they transport information • Identify the different layers of the open systems interconnection (OSI) model	
Two	IT 4.3 Explain the underlying structures and technologies used to support the Internet. Examples: • Explain how a user connects to the Internet • Identify different Internet connections and how they differ • Explain web basics and how information is created and transmitted	

Notes:

Indicator # IT 5. Understand computer network and telecommunications technologies.

Webb Level	*Sub-indicator*	*Integrated Content*
One	IT 5.1 Understand the fundamentals of data communications Examples: • Identify the types of signals and transmission capacities used in telecommunications	
One	IT 5.2 List the types of media, devices, and software needed for networking services. Examples: • Identify types of networking media, their differences, and limitations • Identify hardware required within a network for data transmission • Identify network operating systems and management software • Create common networking media	
One	IT 5.3 List and describe the popular forms of wireless technologies Examples: • Identify types of wireless devices and how they transmit information • Explain how cell phones transmit voice and data • Explain how GPS devices work and assist people • Research the impact radio frequency identification (RFID) has on personal and business applications	

Notes:

Indicator # IT 6. Understand the needs and uses for digital media.

Webb Level	*Sub-indicator*	*Integrated Content*
One	IT 6.1 Understand the uses of digital media. Examples: • Identify common digital formats • Covert digital files from one format to another • Explain copyright issues regarding digital media	
Two	IT 6.2 Discuss how interactive media is used to educate and entertain. Examples: • Explain how interactive media is used in education • Explain the impact of simulators on training individuals • Research interactive media advances in home entertainment.	

Notes:

Indicator# IT 7. Understand computer crime and information security.

Webb Level	*Sub-indicator*	*Integrated Content*
One	IT 7.1 Describe methods of keeping electronic devices secure Examples: • Identity types of machine-level security procedures • Research the impact of biometrics authentication, e.g. retinal scanning.	
Two	IT 7.2 Discuss the threats and defenses for networks Examples: • Define multiuser systems and how to protect them • Explain common threats to wireless networks • Explain how and why it is important to secure wireless networks • Research methods on stealing wireless connections	
Three	IT 7.3 Describe the threats posed by hackers, software, scams and the methods of defending against them Examples: • Research famous hackers and the damage they caused • Identify popular methods of attacks • Explain the types of viruses and how they are spread • Identify key frauds, scams, and hoaxes and how to research validity of information	

Notes:

Indicator # IT 8. Understand technology ethics in a global society.

Webb Level	*Sub-indicator*	*Integrated Content*
Two	IT 8.1 Describe the negative and positive impacts of social media Examples: • Research laws and censorship issues regarding technology • Explain content-filtering and how it is used • Identity technology issues related to freedom of speech	
Two	IT 8.2 Explain the ways in which technology is used to invade personal privacy Examples: • Research technologies that are considered invasion of personal privacy • Research technologies and the digital footprints left by them • Research how the Patriot Act has impacted invasion of personal privacy devices	
One	IT 8.3 Identify ethical issues related to digital technology Examples: • Explain how ethics play a role in personal, professional, and governmental use of technology • Discuss the socioeconomic digital divide • Discuss accommodations needed to assist individuals with disabilities to access technology	

Notes:

Indicator # IT 9. Explore careers in information technology.

Webb Level	*Sub-indicator*	*Integrated Content*
One	IT 9.1 Identify skills, interests, and abilities related to information technology. Examples: • Job shadowing, guest speakers, and online resources	
Two	IT 9.2 Compare personal interest survey results with information technology occupations Example: • Use South Dakota MyLife to research and compare careers	
Three	IT 9.3 Research labor market information for information technology. Examples: • Write a short essay citing demographics, wages and geographical locations	
Two	IT 9.4 Demonstrate necessary job skills needed for Information and Technology industries Examples: • Attendance and punctuality • Positive attitude • Positive work ethic • Use of proper social skills • Display ability to work as part of team and take direction from others	

Notes:

Indicator # IT 10. Demonstrate knowledge of the software development process.

Webb Level	*Sub-indicator*	*Integrated Content*	
	IT 10.1 - Apply tools for developing software applications Examples: • Introduce students to an editor to create a program • Create "Hello World"		
	IT 10.2 – Demonstrate knowledge of programming structures Examples: • Use online resources to create and debug a block program.		

Notes:

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Computer Hardware & Software

Career Cluster	Information Technology
Course Code	10254
Prerequisite(s)	Introduction to Information Technology Careers (Recommended), Computer Applications (Recommended)
Credit	.5-1
Program of Study and Sequence	Computer Hardware & Software is recommended as a prerequisite for two pathways: Programming and Networking & Hardware.
Student Organization	Skills USA, Future Business Leaders of America, CyberPatriots
Coordinating Work-Based Learning	Job Shadowing, Guest Speakers, Tours, Personal Portfolios
Industry Certifications	None
Dual Credit or Dual Enrollment	TBD
Teacher Certification	K-12 Educational Technology, K-12 Classroom Technology
Resources	

Course Description: The Computer Hardware & Software course will prepare students to become more knowledgeable about the integral components of a computer system. Topics covered in the class include individual hardware components, upgrading and troubleshooting a computer, installing operating systems, and configuring basic network services.

Program of Study Application

Computer Hardware & Software is cluster course leading to the Programming and Networking & Hardware pathways.

Course Standards

Indicator # CIT 1 Apply knowledge of hardware design, operation and maintenance

Webb Level	*Sub-indicator*	*Integrated Content*
Two	CIT 1.1 Understand how to design and assemble systems that use computer programs to interact with hardware Examples: • Demonstrate knowledge of the functions of internal components • Identify primary personal computer (PC) components and functions of each • Demonstrate knowledge of how hardware components interact and how conflicts arise • Access needed information using manufacturers' references • Secure supplies and resources • Respond to error messages and symptoms of hardware failures • Install boards to support peripherals • Connect peripherals to central processing unit (CPU) • Employ appropriate safety precautions when working with PCs • Document system installation activities • Backup system configuration • Test functionality of components and verify system operation	

Three	CIT 1.2 Install and configure essential computer hardware and software components Examples: • Demonstrate the use and repair/replacement of volatile and nonvolatile memory • Test system using diagnostic tools/software • Differentiate between hardware and software failure • Update flash memory basic input/output system (BIOS) • Optimize hard drive • Gather information from end user by using different questioning techniques • Conduct appropriate diagnostic tests • Troubleshoot malfunctioning hardware • Recover data and/or files • Restore system to normal operating standards	Could be physically installed or simulated

Notes:

Indicator # CIT 2 Understand the relationships among computer hardware, networks, and operating systems

Webb Level	*Sub-indicator*	*Integrated Content*
One	CIT 2.1 Identify new IT technologies relevant to computer hardware Examples: • Assess the importance of new technologies for future developments • Identify system-processing requirements • Identify data communication trends and major current issues	
Two	CIT 2.2 Determine compatibility of hardware and software Examples: • Identify benchmark metrics for performance • Determine if hardware meets software requirements • Understand the evolution of hardware and software advances	
Two	CIT 2.3 Understand the difference between an operating system, utility programs, and application software Examples: • Install an operating system • Use utility program to diagnose and correct problems • Install/un-install and configure various application software	Could be physically installed or simulated

Notes:

Indicator # CIT 3 Understand basic networking services

Webb Level	*Sub-indicator*	*Integrated Content*
Two	CIT 3.1 Understand the basics of Internet protocol (IP) addressing Examples: • Configure a computer for a static IP address, subnet mask, default gateway, and domain name system (DNS) • Understand the difference between static and dynamic host configuration protocol (DHCP) addressing	
Four	CIT 3.2 Troubleshoot basic network problems Examples: • Resolve IP address conflicts • Use network utility commands to troubleshoot problems	

Notes:

Indicator # CIT 4 Explore Careers in information technology

Webb Level	*Sub-indicator*	*Integrated Content*
One	CIT 4.1 Identify skills, interests, and abilities related to information technology Examples: • Job shadowing, guest speakers, and online resources	Job Shadowing, Guest Speakers, Tours
Two	CIT 4.2 – Identify personal interests using survey instruments with information technology occupations Example: • Use South Dakota MyLife to research and compare careers	Personal Portfolios
Three	CIT 4.3 – Research labor market information for information technology Examples: • Write a short essay citing demographics, wages and geographical locations	
Two	CIT 4.4 Demonstrate necessary job skills needed for Information and Technology industries Examples: • Attendance and punctuality • Positive attitude • Positive work ethic • Use of proper social skills • Display ability to work as part of team and take direction from others	

Notes:

Web Development I & II*

Career Cluster	Information Technology
Course Code	10161
Prerequisite(s)	Computer Applications Introduction to Information Technology (recommended) Computer Information Technology (recommended)
Credit	.5-1
Program of Study and Sequence	Web Development I & Web Development II is an option inside the Programming Pathway.
Student Organization	SkillsUSA, Future Business Leaders of America, CyberPatriots
Coordinating Work-Based Learning	Job Shadowing, Informational Interviews, Tours
Industry Certifications	None
Dual Credit or Dual Enrollment	TBD
Teacher Certification	K-12 Educational Technology, K-12 Classroom Technology
Resources	

Course Description:

Web Development I is a course designed to guide students in a project-based environment implementing web development techniques. Through the use of hypertext markup language (HTML5) coding, Cascading Style Sheets (CSS), and JavaScript students will plan, design, develop, deploy, and maintain website projects. Students will learn fundamentals for a career in web development as they complete projects and create their own website. Web Development II reviews and builds on the concepts introduced in Web Development I including live production and scripting.

Program of Study Application

Web Development I & II is an option inside the Programming Pathway.

Note:

All Web Development standards integrate aspects of language arts and mathematics.

Course Standards

Indicator # WD 1 Identify basic principles of how the Internet is constructed, how it functions and how it is used.

Webb Level	*Sub-indicator*	*Integrated Content*
1	WD 1.1 Identify the infrastructure required to access the Internet. Examples: o Explain hardware and software used to connect to the Internet o Explain the role of an Internet Service Provider (ISP)	
1	WD 1.2 Summarize Internet development and functions Examples: o Discuss how the Internet was developed o Discuss the purpose of web servers, routers, packets, Internet protocol (IP) addresses, and firewalls	
1	WD 1.3 Recognize the purpose of domains Examples: o Explain the purpose and types of IP addresses: dynamic host configuration protocol (DHCP), static o Explain the purpose of a domain name	
2	WD 1.4 Define the function of a Domain Name Server (DNS) Examples: o Investigate DNS services o Discuss domain name registration	
1	WD 1.5 Define important Internet communications protocols and their roles in delivering basic Internet services Examples: o Explain the terms: hypertext transfer protocol (HTTP), hypertext transfer protocol secure (HTTPS), file transfer protocol (FTP), and transmission control protocol/Internet protocol (TCP/IP) o Describe how each protocol is used	

1	WD 1.6 Demonstrate knowledge of standard copyright rules. Examples: o Define copyright for original creations o Define the creative commons license o Identify when to obtain permission for non-original work	
2	WD 1.7 Explain the use and purpose of acceptable use policy (AUP) Examples: o Review the AUP of your school o Demonstrate ethical behavior as described in the AUP	

Notes:

Indicator # WD 2. Demonstrate creation of web pages.

Webb Level	*Sub-indicator*	*Integrated Content*
2	WD 2.1 Demonstrate knowledge required to create a web page Examples: o Code the foundation of a webpage o Include the element tags html, head, title, and body	
2	WD 2.2 Demonstrate appropriate file structure and naming Examples: o Use logical file structure to build websites o Incorporate appropriate file naming of a website	
2	WD 2.3 Create web pages with appropriate HTML structure and standards that can be validated using World Wide Web Consortium validator (W3C) Examples: o Use lowercase for elements o Properly nest elements o Use quotes on attribute values	
3	WD 2.4 Demonstrate the use of elements and attributes. o Create pages with tags and attributes at the block and inline level o Create web pages with text formatting, links, images, lists, tables, etc. o Implement special characters such as: non-breaking space ( ); copyright symbol (&copy); quotation mark (&quot); less than (&lt); greater than (&gt); ampersand (&amp); em dash (&mdash); o Demonstrate use of semantics such as: header, footer, section, article, nav, aside	

2	WD 2.5 Incorporate meta tags for page documentation and search engine optimization (SEO) Examples: o Specify page description, keywords, and author using meta tags o Declare encoding using meta tags o Discuss principles of search engine optimization	
4	* WD 2.6 Implement advanced elements to create web pages Examples: o Incorporate image maps on web page o Incorporate forms on a web page o Using a graphical user interface (GUI)-based HTML editing software to create web pages	

Notes:

Indicator # WD 3. Format web pages using Cascading Style Sheets (CSS).

Webb Level	*Sub-indicator*	*Integrated Content*
2	WD 3.1 Apply essential aspects of the CSS Examples: o Add background attributes such as: color and image o Add font attributes such as: type, size, and color o Add border attributes such as: width, style, and color	
2	WD 3.2 Apply CSS to a website Examples: o Apply CSS to an element using an inline style o Apply CSS to a webpage using an internal style o Apply CSS to a website using an external stylesheet	
3	WD 3.3 Use selectors in a CSS Examples: o Implement a type selector to modify an HTML element o Implement an id selector to modify a single element on the page o Implement class selectors to modify several class elements o Implement contextual selectors to modify nested elements	
4	* WD 3.4 Format page layout with advanced CSS Examples: o Use width, height, or auto to adjust the size o Use float to position elements o Use absolute and relative to position elements o Use text align, margin, and padding	Enhanced Critical Thinking & Problem Solving

Notes:

Indicator # WD 4. Plan, design, implement, and maintain website(s).

Webb Level	*Sub-indicator*	*Integrated Content*
2	WD 4.1 Analyze project requirements Examples: o Identify the purpose and audience for a website o Demonstrate knowledge of website accessibility standards that address the needs of people with visual and motor impairments, such as alt tags, strong instead of bold, etc. o Identify and follow steps in the website planning and development	Demonstrate Knowledge of 5.08 (Accessibility Requirements of the American Disabilities Act)
2	WD 4.2 Plan site design and page layout Examples: o Demonstrate knowledge of best practices for designing a website; such as maintaining consistency, separating content from design, using standard fonts, Google fonts, and web-safe colors. o Demonstrate effective web development and design principles, including the use of color, white space, font styles, viewing patterns, background images, balance, etc. o Identify basic principles of website usability, readability, and accessibility o Plan a website by using sketches, website hierarchy, or site map o Communicate with others about design and content plans o Produce website designs that work on various devices and browser versions/configurations o Plan, communicate, or present a website before, during or after website development	

4	* WD 4.3 Create content for website Examples: o Create and prepare two dimensional (2D) images o Create rich media such as video, sound and animation o Identify when to use various images and digital media file formats o Optimize images for web content, such as resize, compress, thumbnails o Insert navigation bars, rollover images, or buttons created in graphics editor	
4	* WD 4.4 Upload and maintain a site. Examples: o Upload pages to a web server o Conduct basic technical tests such as validating the website (w3c compliant), accessibility, search engine optimization (SEO), etc. o Identify methods for collecting site feedback, such as counters, feedback forums, Google Analytics, Google Webmaster Tools o Document all aspects of website maintenance	

Notes:

Indicator # WD 5. Explore advanced web concepts.*

Webb Level	*Sub-indicator*	*Integrated Content*
3	* WD 5.1 Demonstrate the use of scripting and other interactive tools Examples: o Add interactivity to your website using JavaScript & jQuery o Differentiate between client side and server side scripting languages	
2	* WD 5.2 Explore other web technologies Examples: o Identify when to use a database o Describe new and emerging Web technologies such as Web2.0, wikis, blogs, forums, etc. o Research the purpose of content management systems (CMS) such as Joomla, Wordpress, etc. o Explore concepts of responsive design	

Notes:

Indicator # WD 6. Explore careers in Web Development.

Webb Level	*Sub-indicator*	*Integrated Content*
2	WD 6.1 Explore Information Technology (IT) Web Development careers Examples: o Identify job roles in the IT industry as they apply to web development. o Understand the responsibilities, tasks, and skills each job requires	
2	WD 6.2 Demonstrate job skills for programming industries. Examples: o Attendance and punctuality o Positive attitude o Positive work ethic o Use of proper social skills o Display ability to work as part of team and take direction from others	

Notes:

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Computer Programming I & II*

Career Cluster	Information Technology
Course Code	10152
Prerequisite(s)	Computer Applications, Introduction to Information Technology Careers (recommended), Computer Hardware & Software (recommended)
Credit	.5-1
Program of Study and Sequence	Computer Programming or a dual credit equivalent is required for the Programming Pathway and recommended for the Networking & Hardware Pathway
Student Organization	SkillsUSA, Future Business Leaders of America (FBLA), CyberPatriots
Coordinating Work-Based Learning	Job Shadowing, Tours, Informational Interviews, Internships
Industry Certifications	None
Dual Credit or Dual Enrollment	TBD
Teacher Certification	K-12 Educational Technology Endorsement, K-12 Classroom Technology
Resources	

Course Description:

Computer Programming I introduces students to the fundamentals of computer programming. Students will learn to design, code, and test their own programs while applying mathematical concepts. Teachers introduce concepts and problem solving skills through a programming language such as C, C++, C#, Java, Python, or Visual Basic. Computer Programming II reviews and builds on the concepts introduced in Computer Programming I and introduces students to more complex data structures. Topics include sequential files, arrays, and classes.

(*Computer Programming II)

Program of Study Application

Computer Programming is required for the Programming Pathway and recommended for the Networking & Hardware Pathway.

Notes:

All computer programming standards integrate aspects of language arts and mathematics.

Career Cluster: Information Technology

Course: Computer Programming

Course Standards

Indicator # CP 1 Identify and use a programming environment.

Webb Level	*Sub-indicator*	*Integrated Content*
1	CP 1.1 Demonstrate knowledge of external and internal computer hardware. Examples: • Describe the functions of basic external computer hardware devices (monitor, printer, keyboard, mouse, adapters, other devices) • Describe the functions of the internal components of computers (CPU, RAM, ROM, motherboard, graphics card, hard drive, optical drive)	
1	CP 1.2 Demonstrate knowledge of software concepts. Examples: • Define the distinction between computer software and hardware • Identify software categories such as application software, web-based software, or operating system • Describe the difference between an interpreted language vs a compiled language	
2	CP 1.3 Demonstrate the ability to compile, debug, and execute programs. Examples: • Demonstrate how to use an editor/integrated development environment (IDE) to compile and run programs • Understand the difference between syntax, run-time, and logic errors • Demonstrate how to debug programs	

Notes:

Career Cluster: Information Technology

Course: Computer Programming

Indicator # CP 2 Employ standard conventions for creation and design of a software program.

Webb Level	*Sub-indicator*	*Integrated Content*
2	CP 2.1 Demonstrate the ability to use a standard programming style. Examples: • Demonstrate how to use white space properly • Employ a syntax specific naming convention • Construct identifiers with meaningful format (e.g.: camelCase, under_scores, PascalCase, and ALLCAPS)	
2	CP 2.2 Recognize software development processes. Examples: • Identify specifications and requirements • Decompose a problem into appropriate components • Design solutions using algorithms and other problem solving techniques	
1	CP 2.3 Identify the syntactical components of a program. Examples: • Identify keywords, identifiers, operators, operands, and literals • Identify the entry-point of a program	

Notes:

Career Cluster: Information Technology

Course: Computer Programming

Indicator # CP 3 Properly use language-fundamental commands and operations.

Webb Level	*Sub-indicator*	*Integrated Content*
2	CP 3.1 Demonstrate the ability to use basic elements of a specific language. Examples: • Declare, initialize, and assign values to constants and variables • Demonstrate the ability to use input and output commands • Communicate clearly with output values stored in identifiers • Demonstrate the ability to use strings in programs	
2	CP 3.2 Employ basic arithmetic expressions in programs. Examples: • Use basic arithmetic operators (modulus, multiplication, division, addition, subtraction) • Understand order of operation of expressions	Algebra
3	CP 3.3 Demonstrate the ability to use data types in programs. Examples: • Declare and use variables and constants • Differentiate between data types and their application (Boolean, integer, floating point, strings) • Declare and use enumerators as a list of constants	Algebra
2	CP 3.4 Incorporate functions/methods. Examples: • Write functions for repeated procedures • Identify return values	Algebra

Notes:

Career Cluster: Information Technology

Course: Computer Programming

Indicator # CP 4 Apply control structures.

Webb Level	*Sub-indicator*	*Integrated Content*
2	CP 4.1 Demonstrate the ability to use relational and logical operators in programs. Examples: • Compare values using relational operators • Form complex expressions using logical operators	
3	CP 4.2 Investigate conditional statements. Examples: • Incorporate IF-ELSE structures • Make multiple-way selections (switch, case)	
3	CP 4.3 Implement loops in programs. Examples: • Use initial, terminal, and incremental values in loops • Construct while, do-while, and for loops • Identify nested and infinite loops	

Notes:

Career Cluster: Information Technology

Course: Computer Programming

Indicator # CP 5 Explore career opportunities in programming.

Webb Level	*Sub-indicator*	*Integrated Content*
1	CP 5.1 Identify personal interests and abilities related to Computer Programming/Software Engineering careers. Examples: • Identify personal creative talents • Identify technical/programming talents	Portfolio, SDMyLife
3	CP 5.2 Investigate career opportunities, trends, and requirements related to computer programming/software engineering careers. Examples: • Research job opportunities • Investigate trends associated with computer programming/software engineering careers • Discuss related career pathways	
2	CP 5.3 Demonstrate job skills for programming industries. Examples: • Attendance and punctuality • Positive attitude • Positive work ethic • Use of proper social skills • Display ability to work as part of team and take direction from others	

Notes:

Career Cluster: Information Technology

Course: Computer Programming

Indicator # CP 6: Integrate arrays.*

Webb Level	*Sub-indicator*	*Integrated Content*
2	CP 6.1 Demonstrate the ability to use arrays in programs. Examples: • Declare arrays • Initialize arrays • Add and remove items from array	Placement of topic varies based on different computer languages
3	CP 6.2 Demonstrate the ability to use strings in programs. Examples: • Compare string identifiers • Concatenate string identifiers • Locate substring positions	

Notes:

Career Cluster: Information Technology

Course: Computer Programming

Indicator # CP 7: Implement object-oriented programming techniques.*

Webb Level	*Sub-indicator*	*Integrated Content*
3	CP 7.1 Demonstrate the ability to use existing classes. Examples: • Instantiate objects • Use object data members • Incorporate functions	
4	CP 7.2 Demonstrate the ability to create user-defined classes. Examples: • Create and use data members • Create a constructor to initialize data members • Create and use instance functions	
4	CP 7.3 Demonstrate proper design principles with classes. Examples: • Create classes that are well encapsulated (data members private) • Properly use modifiers and accessors (getters and setters) • Apply private and public modifiers according to program design	

Notes:

Network Technologies

Career Cluster	Information Technology
Course Code	10101
Prerequisite(s)	Introduction To Information Technology Careers (Recommended), Computer Applications (Recommended), Computer Hardware & Software (Recommended)
Credit	.5-1
Program of Study and Sequence	This course or a dual enrollment equivalent is required for the Networking & Hardware pathway and recommended for the Programming pathway
Student Organization	SkillsUSA
Coordinating Work-Based Learning	Guest Speakers, Tours, Job Shadowing, Personal Portfolio
Industry Certifications	None
Dual Credit or Dual Enrollment	TBD
Teacher Certification	K-12 Educational Technology, K-12 Classroom Technology
Resources	

Course Description:

Students in the Network Technologies course prepare for careers that involve network analysis, planning, and implementation, including design, installation, maintenance, and management of network systems. The successful establishment and maintenance of networking infrastructure is critical to the success of organizations.

Program of Study Application

Part of the Networking & Hardware pathway. Recommended courses include: Introduction To Information Technology Careers, Computer Applications, and Computer Hardware & Software.

Notes:

All Networking & Hardware standards integrate aspects of language arts and mathematics.

Course Standards

Indicator # NT 1. Demonstrate knowledge of designing and implementing a networking system.

Webb Level	*Sub-indicator*	*Integrated Content*
1	NT 1.1 - Demonstrate knowledge of basic network communications Examples: • Explore the Open Systems Interconnection (OSI) networking model • Compare different networking communication protocols: transmission control protocol (TCP), Internet protocol (IP), user datagram protocol (UDP) • Describe the channel reservation process used on wireless carrier sense multiple access/collision avoidance (CSMA/CA) protocol • Discuss the carrier sense multiple access/collision detect (CSMA/CD) process on a wired network	
1	NT 1.2 - Demonstrate knowledge of basic network classifications and topologies Examples: • Identify elements found in physical and logical network topologies • Define elements of physical and logical wired and wireless technologies • Evaluate and define a variety of network architectures	
1	NT 1.3 Demonstrate knowledge of common network hardware Examples: • Identify a variety of networking components as media, hosts, peripherals, routers, switches, and other networking devices • Explore network device options and features to specific needs	

4	NT 1.4 Apply knowledge of local area network (LAN) physical media Examples: • Identify and explore cabling standards, including coaxial cable, unshielded twisted pair (UTP), shielded twisted pair (STP), Fiber Optics, and wireless • Construct and test UTP cables • Connect appropriate media to internetworking devices	
1	NT 1.5 Demonstrate knowledge of communication standards for networks Examples: • Distinguish between the capabilities of the currently available Institute of Electrical and Electronics Engineers (IEEE) standards (802.11, 802.3, 802.5, 802.15) • Suggest appropriate wide area network (WAN) connections based on a match between connection standard and user requirements. (Fiber, digital subscriber line (DSL), transmission system 1 (T1)	
4	NT 1.6 Plan, design, and create network architecture Examples: • Identify current and future needs of a network • Discuss subnetting and binary systems • Use design software to create a simulated network • Build a physical network as outlined in design	
2	NT 1.7 Demonstrate knowledge of Network Operating Systems (NOS) Examples: • Contrast the features of an Operating System and a NOS • Discuss services offered by a network operating system (Active Directory, Web Server, dynamic host configuration protocol (DHCP), domain name system (DNS)	

Notes:

Indicator # NT 2. Perform network operating system installation and configuration.

Webb Level	*Sub-indicator*	*Integrated Content*
2	NT 2.1 Install a network operating system Examples: • Identify enterprise network documentation that help determine system requirements • Install Windows Server operating system • Install UNIX/Linux server operating system	
2	NT 2.2 Configure a network operating system Examples: • Setup proper IP addressing and subnets • Setup a directory service (Active Directory) • Create network users • Identify policies and procedures for routine administration (user agreements, incident reporting, recovery for users, software updates)	
4	NT 2.3 Troubleshoot and resolve network problems Examples: • Resolve IP addressing conflicts • Use appropriate network utilities to troubleshoot various connectivity issues • Troubleshoot using simulation software	

Notes:

Indicator # NT 3. Apply knowledge of network security systems.

Webb Level	*Sub-indicator*	*Integrated Content*
3	NT 3.1 Apply proper procedures for securing a network Examples: • Discuss various network security solutions • Configure wireless security settings for integrated router • Configure firewall settings on a graphical user interface (GUI) interface to create a demilitarized zone (DMZ) • Use permissions to secure data on a host (local file and network permissions)	
2	NT 3.2 Demonstrate penetration testing and ethical hacking Examples: • Discuss penetration testing techniques • Utilize software for ethical hacking to identify vulnerabilities	

Notes:

Indicator # NT 4. Demonstrate knowledge of common help desk tools, resources and techniques.

Webb Level	*Sub-indicator*	*Integrated Content*
2	NT 4.1 Use proper documentation and incident reporting Examples: • Install and utilize an information technology (IT) support ticket system • Manage priorities effectively	
3	NT 4.2 Incorporate customer service skills Examples: • Use remote software to guide end users to solve a problem • Communicate effectively with end users	

Notes:

Indicator # NT 5. Explore Careers in Network Technology

Webb Level	*Sub-indicator*	*Integrated Content*
1	NT 5.1 Identify skills, interests, and abilities related to network technology Example: • Job shadowing, guest speakers, and online resources	Job Shadowing, Guest Speakers, Tours
2	NT 5.2 Compare personal interest survey results with network technology occupations Example: • Use South Dakota MyLife to research and compare careers	Personal Portfolios
3	NT 5.3 Research labor market information for network technology Example: • Write a short essay citing demographics, wages and geographical locations	
2	NT 5.4 Demonstrate necessary job skills needed for information technology industries Examples: • Attendance and punctuality • Positive attitude • Positive work ethic • Use of proper social skills • Display ability to work as part of team and take direction from others	

Notes:

Indicator # NT 6. Maintain a safe and environmentally conscious environment.

Webb Level	*Sub-indicator*	*Integrated Content*			
2	NT 6.1 Determine safe working practices to avoid or eliminate physical and electrical hazards Examples: • Use proper safety equipment • Follow proper safety procedures • Identify techniques to manage power consumption • Describe and resolve the most common electrostatic discharge hazards				
1	NT 6.2 Research environmental considerations when disposing of material Examples: • Identify the proper disposal methods for toner cartridges, batteries, and hardware • List local, state, & federal environmental regulations				

Notes: