



Foundational CTE Courses

Career Exploration (22151^)
Employability (22152^)
Entrepreneurship (12053^)
Foundations of Technology (10004^)
Leadership & Service(22101^)

Cluster Courses

Introduction to Information Technology (10003^)
Computer Hardware & Software (10251)
PLTW MS Computer Science (10604)
PLTW Computer Science Essentials (10013)
Computer Science Essentials
Computer Science Principles

Pathway Courses

<i>Networking Systems Pathway</i>	<i>Programming & Software Development Pathway</i>	<i>Web & Digital Communication Pathway</i>	<i>Information Support Services Pathway</i>
Cybersecurity (10108) Adv. Computer Programming	Web Development (10201^) Advanced Web Development Computer Programming I (10152^) Adv. Computer Programming	Web Development (10201^) Advanced Web Development	Network Technologies (10101)
	PLTW Computer Science:		
	PLTW Computer Science Principles (10015) PLTW Computer Science A (10157) PLTW Cybersecurity (10016)		

Dual Credit Courses

Visit www.sdmylife.com for a full list of dual credit courses in the Information Technology Career Cluster.

Academic CTE Courses

Physics (03151^)
Pre-Calculus (02110^)
Calculus (02121)
Trigonometry (02103^)

Capstone CTE Courses

Entrepreneurship Experience (80026)
Senior Experience (80019^)
Youth Apprenticeship (80020)
Service Learning (22104)
Youth Internships (80018^)

^Denotes course is available on the SD Virtual School (<http://www.sdvs.k12.sd.us/>)

Introduction to Information Technology

Career Cluster	Information Technology
Course Code	10003
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	Information Technology Cluster Endorsement; 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.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	IT 1.1 Define the relationship between electronic devices and computers.	
Level 1: Recall	IT 1.2 Describe the functional areas in which computers assist people.	
Level 1: Recall	IT 1.3 Describe how technology is impacting community.	
Level 1: Recall	IT 1.4 List physical and mental health dangers associated with computer use.	

INDICATOR #IT 2. Understand computer hardware required to meet specific needs.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	IT 2.1 Understand how computer information is represented.	
Level 1: Recall	IT 2.2 Identify hardware components and their relationship to computer usage.	
Level 2: Skill/Concept	IT 2.3 Understand different types of memory and storage.	
Level 1: Recall	IT 2.4 Identify input and output devices to meet the needs of users.	
Level 2: Skill/Concept	IT 2.5 Understand the decision-making process involved in purchasing computer systems.	

INDICATOR #IT 3. Understand software solutions for personal and professional use.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	IT 3.1 Explain how software is created, distributed, installed, and maintained.	
Level 1: Recall	IT 3.2 Describe the functions of system software and operating systems.	
Level 2: Skill/Concept	IT 3.3 Describe different types and purposes of productivity software.	

INDICATOR #IT 4. Understand technology used for the Internet.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	IT 4.1 Describe how the Internet developed.	
Level 1: Recall	IT 4.2 Explain how hardware, protocols, and software work together to create the Internet.	
Level 2: Skill/Concept	IT 4.3 Explain the underlying structures and technologies used to support the Internet.	

INDICATOR #IT 5. Understand computer network and telecommunications technologies.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>

Level 1: Recall	IT 5.1 Understand the fundamentals of data communications.	
Level 1: Recall	IT 5.2 List the types of media, devices, and software needed for networking services.	
Level 1: Recall	IT 5.3 List and describe the popular forms of wireless technologies.	

INDICATOR #IT 6. Understand the needs and uses for digital media.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	IT 6.1 Understand the uses of digital media.	
Level 2: Skill/Concept	IT 6.2 Discuss how interactive media is used to educate and entertain.	

INDICATOR #IT 7. Understand computer crime and information security.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	IT 7.1 Describe methods of keeping electronic devices secure.	
Level 2: Skill/Concept	IT 7.2 Discuss the threats and defenses for networks.	
Level 3: Strategic Thinking	IT 7.3 Describe the threats posed by hackers, software, scams and the methods of defending against them.	

INDICATOR #IT 8. Understand technology ethics in a global society.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	IT 8.1 Describe the negative and positive impacts of social media.	
Level 2: Skill/Concept	IT 8.2 Explain the ways in which technology is used to invade personal privacy.	
Level 1: Recall	IT 8.3 Identify ethical issues related to digital technology.	

INDICATOR #IT 9. Explore careers in information technology.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	IT 9.1 Identify skills, interests, and abilities related to information technology.	
Level 2: Skill/Concept	IT 9.2 Compare personal interest survey results with information technology occupations.	
Level 3: Strategic Thinking	IT 9.3 Research labor market information for information technology.	
Level 2: Skill/Concept	IT 9.4 Demonstrate necessary job skills needed for Information and Technology industries.	

INDICATOR #IT 10. Demonstrate knowledge of the software development process.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>

Level 4: Extended Thinking	IT 10.1 Apply tools for developing software applications.	
Level 3: Strategic Thinking	IT 10.2 Demonstrate knowledge of programming structures.	

Proposed

Computer Science Principles

Career Cluster	Information Technology
Course Code	
Prerequisite(s)	Introduction to Information Technology (recommended) Computer Science Essentials (recommended) Computer Hardware and Software (recommended)
Credit	.5-1
Program of Study and Sequence	Computer Science Principles 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	Guest Speakers, Tours, Job Shadowing, Personal Portfolio
Industry Certifications	None
Dual Credit or Dual Enrollment	TBD
Teacher Certification	Information Technology Cluster Endorsement; Networking Systems & Information Support Pathway Endorsement; K-12 Educational Technology Endorsement; K-12 Classroom Technology Endorsement
Resources	

Course Description:

Computer Science Principles is a course designed to build upon and investigate knowledge in computer science concepts. Topics covered in the class include computing systems, networks and the Internet, data and analysis, algorithms and programming, and the impacts of computing.

Program of Study Application

Computer Science Principles is part of the Programming and Software Development Pathway

Course Standards

INDICATOR # CSP 1 Investigate computer systems and their functions.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	CSP 1.1 Compare and contrast how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.	
Level 3: Strategic Thinking	CSP 1.2 Use concepts to compare levels of abstraction and interactions between application software, system software, and hardware layers.	
Level 2: Skill/Concept	CSP 1.3 Develop and implement guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.	

INDICATOR # CSP 2 Investigate networks and the internet.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	CSP 2.1 Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).	
Level 2: Skill/Concept	CSP 2.2 Give examples to illustrate how sensitive data can be affected by malware and other attacks.	
Level 3: Strategic Thinking	CSP 2.3 Recommend security measures to address various scenarios based on the CIA Triad (confidentiality, integrity, and availability).	

Level 3: Strategic Thinking	CSP 2.4 Recommend various security measures, considering tradeoffs between the usability and security of a computing system.	
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INDICATOR # CSP 3 Investigate data and analysis.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	CSP 3.1 Translate between different bit representations of real-world phenomena, such as characters, numbers, and images.	
Level 3: Strategic Thinking	CSP 3.2 Evaluate the tradeoffs in how data elements are organized and where data is stored.	
Level 4: Extended Thinking	CSP 3.3 Select and use data collection tools and techniques to generate data sets that support a claim or communicate information.	

INDICATOR # CSP 4 Evaluate and construct algorithms and programming and how they are used in computing.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	CSP 4.1 Use and evaluate algorithms in terms of their efficiency, correctness, and clarity.	
Level 2: Skill/Concept	CSP 4.2 Compare and contrast fundamental data structures and their uses.	

Level 3: Strategic Thinking	CSP 4.3 Recommend specific control structures and identify tradeoffs involving implementation, readability, and program performance.	
Level 3: Strategic Thinking	CSP 4.4 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.	
Level 4: Extended Thinking	CSP 4.5 Construct solutions to problems based on user feedback.	
Level 3: Strategic Thinking	CSP 4.6 Plan and develop programs for broad audiences using a software life cycle process.	
Level 2: Skill/Concept	CSP 4.7 Investigate and compare multiple programming languages and discuss how their features make them suitable for solving different types of problems.	

INDICATOR # CSP 5 Investigate impacts of computing.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	CSP 5.1 Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.	
Level 3: Strategic Thinking	CSP 5.2 Identify and critique bias, equity, access, and influence in existing computer programs.	
Level 2: Skill/Concept	CSP 5.3 Identify and use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.	

Level 2: Skill/Concept	CSP 5.4 Debate laws and regulations that impact the development and use of software.	
Level 1: Recall	CSP 5.5 Explore careers in computer science.	

Proposed

Computer Science Essentials

Career Cluster	Information Technology
Course Code	
Prerequisite(s)	Introduction To Information Technology Careers (Recommended), Computer Applications (Recommended), Computer Hardware & Software (Recommended)
Credit	.5-1
Program of Study and Sequence	Computer Science Essentials is a Cluster course in the Information Technology cluster.
Student Organization	SkillsUSA, Future Business Leaders of America (FBLA), CyberPatriots
Coordinating Work-Based Learning	Tours, Guest Speakers, Field Trips, Job Shadows, Internships, Volunteer
Industry Certifications	None
Dual Credit or Dual Enrollment	TBD
Teacher Certification	Information Technology Cluster Endorsement; Networking Systems & Information Support Pathway Endorsement; K-12 Educational Technology Endorsement; K-12 Classroom Technology Endorsement
Resources	

Course Description:

Computer Science Essentials is a course designed to guide students in exploring a foundation of knowledge in computer science concepts. Topics covered in the class include computing systems, networks and the Internet, data and analysis, algorithms and programming, and the impacts of computing.

Program of Study Application

Computer Science Essentials is a Cluster course in the Information Technology cluster.

Course Standards

INDICATOR CSE #1 Explore computer systems and their functions.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	CSE 1.1 Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.	
Level 2: Skill/Concept	CSE 1.2 Compare levels of abstraction and interactions between application software, system software, and hardware layers.	
Level 1: Recall	CSE 1.3 Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.	

INDICATOR CSE #2 Explore networks and the internet.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	CSE 2.1 Identify network components by describing the relationship between routers, switches, servers, topology, and addressing.	
Level 2: Skill/Concept	CSE 2.2 Give examples to illustrate how sensitive data can be affected by malware and other attacks.	

Level 2: Skill/Concept	CSE 2.3 Identify security measures to address various scenarios based on the CIA Triad (confidentiality, integrity, and availability).	
Level 2: Skill/Concept	CSE 2.4 Compare various security measures, considering tradeoffs between the usability and security of a computing system.	

INDICATOR CSE #3 Explore data and analysis.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	CSE 3.1 Translate between different bit representations of real-world phenomena, such as characters, numbers, and images.	
Level 2: Skill/Concept	CSE 3.2 Evaluate the tradeoffs in how data elements are organized and where data is stored.	

INDICATOR CSE #4 Identify and define algorithms and programming and how they are used in computing.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	CSE 4.1 Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.	
Level 1: Recall	CSE 4.2 Investigate specific control structures and tradeoffs involving implementation, readability, and program performance.	

Level 3: Strategic Thinking	CSE 4.3 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.	
Level 2: Skill/Concept	CSE 4.4 Understand the purpose of gathering feedback when creating software.	
Level 1: Recall	CSE 4.5 Examine software licenses, including copyright, freeware, and open-source licensing.	
Level 3: Strategic Thinking	CSE 4.6 Evaluate computer programs for intended outcomes.	

INDICATOR CSE #5 Explore impacts of computing.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	CSE 5.1 Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.	
Level 2: Skill/Concept	CSE 5.2. Examine and identify bias and equity deficits in existing computer programs.	
Level 2: Skill/Concept	CSE 5.3 Identify and use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.	
Level 2: Skill/Concept	CSE 5.4 Explore privacy concerns and intellectual property laws related to computing.	
Level 1: Recall	CSE 5.5 Explore careers in computer science.	

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	Information Technology Cluster Endorsement; Networking Systems & Information Support Pathway Endorsement; K-12 Educational Technology Endorsement; K-12 Classroom Technology Endorsement
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.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	NT 1.1 Demonstrate knowledge of basic network communications.	
Level 1: Recall	NT 1.2 Demonstrate knowledge of basic network classifications and topologies.	
Level 1: Recall	NT 1.3 Demonstrate knowledge of common network hardware.	
Level 4: Extended Thinking	NT 1.4 Apply knowledge of local area network (LAN) physical media.	
Level 1: Recall	NT 1.5 Demonstrate knowledge of communication standards for networks.	
Level 4: Extended Thinking	NT 1.6 Plan, design, and create network architecture.	
Level 2: Skill/Concept	NT 1.7 Demonstrate knowledge of Network Operating Systems (NOS).	

INDICATOR # NT 2. Perform network operating system installation and configuration.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	NT 2.1 Install a network operating system.	
Level 2: Skill/Concept	NT 2.2 Configure a network operating system.	

Level 4: Extended Thinking	NT 2.3 Troubleshoot and resolve network problems.	
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INDICATOR # NT 3. Apply knowledge of network security systems.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	NT 3.1 Apply proper procedures for securing a network.	
Level 2: Skill/Concept	NT 3.2 Demonstrate penetration testing and ethical hacking.	

INDICATOR # NT 4. Demonstrate knowledge of common help desk tools, resources and techniques.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	NT 4.1 Use proper documentation and incident reporting.	
Level 3: Strategic Thinking	NT 4.2 Incorporate customer service skills.	

INDICATOR # NT 5. Explore Careers in Network Technology.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	NT 5.1 Identify skills, interests, and abilities related to network technology.	

Level 2: Skill/Concept	NT 5.2 Compare personal interest survey results with network technology occupations.	
Level 3: Strategic Thinking	NT 5.3 Research labor market information for network technology.	
Level 2: Skill/Concept	NT 5.4 Demonstrate necessary job skills needed for information technology industries.	

INDICATOR # NT 6. Maintain a safe and environmentally conscious environment.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	NT 6.1 Determine safe working practices to avoid or eliminate physical and electrical hazards.	
Level 1: Recall	NT 6.2 Research environmental considerations when disposing of material.	

PROPOSED

Cybersecurity

Career Cluster	Information Technology
Course Code	10201
Prerequisite(s)	Foundations of Technology (recommended) Introduction to Information Technology (recommended) Computer Science Essentials (recommended)
Credit	1
Program of Study and Sequence	Web Development is an option inside the Networking Systems Pathway.
Student Organization	SkillsUSA, Future Business Leaders of America, CyberPatriots
Coordinating Work-Based Learning	Job Shadowing, Informational Interviews, Internships, Tours
Industry Certifications	None
Dual Credit or Dual Enrollment	TBD
Teacher Certification	Information Technology Cluster Endorsement; Networking Systems Pathway Endorsement; K-12 Educational Technology Endorsement; K-12 Classroom Technology Endorsement
Resources	

Course Description:

Cyber security is an increasingly in-demand field in the Information Technology Cluster. In this course, student will look at the major ideas in the fields of cybersecurity or information assurance. The course design addresses the fundamental implications of technology, the history of securing information and the relationship to the evolution of technology, and the need to securely transmit and store information. This course will look at the ways computers, programs, networks, and people, are exploited by hackers, and what can be done to prevent or minimize the damage. Students will learn foundational cybersecurity topics including digital citizenship and cyber hygiene.

Course Standards

INDICATOR # CYB 1 Explore to Cybersecurity Concepts		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	CYB 1.1 Define the importance of the cybersecurity industry.	
Level 1: Recall	CYB 1.2 Identify the role cybersecurity plays in personal usage	
Level 1: Recall	CYB 1.3 Identify the role cybersecurity plays in industry usage.	

INDICATOR # CYB 2 – Establishing Trust Cybersecurity		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	CYB 2.1 Investigate the Confidentiality Integrity Availability (CIA) Triad – Security Models.	
Level 3: Strategic Thinking	CYB 2.2 Compare and contrast usability and security.	

INDICATOR # CYB 3 Explore Data Security and Security Systems		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	CYB 3.1 Investigate encryption and encryption types.	

Level 3: Strategic Thinking	CYB 3.2 Investigate how businesses utilize security systems.	
Level 3: Strategic Thinking	CYB 3.3 Compare and contrast public versus private wifi.	
Level 3: Strategic Thinking	CYB 3.4 Explore processes that maintain integrity of data.	
Level 3: Strategic Thinking	CYB 3.5 Investigate data breaches and its impact on business and customers.	

INDICATOR # CYB 4 Examine risks, vulnerabilities, threats, and implications		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	CYB 4.1 Differentiate between threats, vulnerabilities, and attacks.	
Level 2: Skill/Concept	CYB 4.2 Utilize adversarial thinking	
Level 2: Skill/Concept	CYB 4.3 Describe common security related software vulnerabilities	
Level 3: Strategic Thinking	CYB 4.4 Explore social engineering techniques related to cybersecurity	

INDICATOR # CYB 5 Examine legal and ethical issues related to cybersecurity		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	CYB 5.1 Compare and contrast ethical versus non-ethical hacking	

Level 2: Skill/Concept	CYB 5.2 Understand confidentiality and the role it plays in cybersecurity.	
Level 1: Recall	CYB 5.3 Discuss the impact of unethical and illegal hacking on quality of life.	
Level 4: Extended Thinking	CYB 5.4 Evaluate how the role of value and ethics impacts laws and policy decisions	
Level 4: Extended Thinking	CYB 5.4 Evaluate how the role of value and ethics impacts laws and policy decisions	

INDICATOR # CYB 6 Explore Careers in cybersecurity		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	CYB 6.1 Identify personal interests and abilities related to cybersecurity careers.	
Level 3: Strategic Thinking	CYB 6.2 Investigate career opportunities, trends, and requirements related to cybersecurity careers	
Level 1: Recall	CYB 6.3 Identify skills needed for cybersecurity careers.	

PROOF

Computer Hardware & Software

Career Cluster	Information Technology
Course Code	10251
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	Information Technology Cluster Endorsement; Networking Systems & Information Support Pathway Endorsement; Computer Repair & Maintenance Endorsement; 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.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	CIT 1.1 Understand how to design and assemble systems that use computer programs to interact with hardware.	
Level 3: Strategic Thinking	CIT 1.2 Install and configure essential computer hardware and software components .	

INDICATOR # CIT 2. Understand the relationships among computer hardware, networks, and operating systems.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	CIT 2.1 Identify new IT technologies relevant to computer hardware.	
Level 2: Skill/Concept	CIT 2.2 Determine compatibility of hardware and software.	
Level 2: Skill/Concept	CIT 2.2 Understand the difference between an operating system, utility programs, and application software.	

INDICATOR # CIT 3. Understand basic networking services.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>

Level 2: Skill/Concept	CIT 3.1 Understand the basics of Internet protocol (IP) addressing.	
Level 4: Extended Thinking	CIT 3.2 Troubleshoot basic hardware and software problems.	

INDICATOR # CIT 4. Explore careers in information technology.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	CIT 4.1 Identify skills, interests, and abilities related to information technology.	
Level 2: Skill/Concept	CIT 4.2 Identify personal interests using survey instruments with information technology occupations.	
Level 3: Strategic Thinking	CIT 4.3 Research labor market information for information technology.	
Level 2: Skill/Concept	CIT 4.4 Demonstrate necessary job skills needed for Information and Technology industries.	

PROOF

Computer Programming I

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 in the Programming Pathway and 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	Information Technology Cluster Endorsement; Programming & Software Development Pathway Endorsement; Engineering & Robotics Pathway Endorsement; 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.

Program of Study Application

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

Course Standards

INDICATOR # CP 1. Identify and use a programming environment.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	CP 1.1 Demonstrate knowledge of software concepts.	
Level 2: Skill/Concept	CP 1.2 Demonstrate the ability to compile, debug, and execute programs.	

INDICATOR # CP 2. Employ standard conventions for creation and design of a software program.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	CP 2.1 Demonstrate the ability to use a standard programming style.	
Level 2: Skill/Concept	CP 2.2 Recognize software development processes.	
Level 1: Recall	CP 2.3 Identify the syntactical components of a program.	

INDICATOR # CP 3. Properly use language-fundamental commands and operations.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	CP 3.1 Demonstrate the ability to use basic elements of a specific language.	
Level 2: Skill/Concept	CP 3.2 Employ basic arithmetic expressions in programs.	

Level 3: Strategic Thinking	CP 3.3 Demonstrate the ability to use data types in programs.	
Level 2: Skill/Concept	CP 3.4 Incorporate functions/methods.	

INDICATOR # CP 4. Apply control structures.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	CP 4.1 Demonstrate the ability to use relational and logical operators in programs.	
Level 3: Strategic Thinking	CP 4.2 Investigate conditional statements.	
Level 3: Strategic Thinking	CP 4.3 Implement loops in programs.	

INDICATOR # CP 5. Explore career opportunities in programming.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	CP 5.1 Identify personal interests and abilities related to Computer Programming/Software Engineering careers.	
Level 3: Strategic Thinking	CP 5.2 Investigate career opportunities, trends, and requirements related to computer programming/software engineering careers.	
Level 2: Skill/Concept	CP 5.3 Demonstrate job skills for programming industries.	

Advanced Computer Programming

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 is in the Programming Pathway and 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	Information Technology Cluster Endorsement; Programming & Software Development Pathway Endorsement; Engineering & Robotics Pathway Endorsement; K-12 Educational Technology Endorsement; K-12 Classroom Technology
Resources	

Course Description:

Advanced Computer Programming 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.

Program of Study Application

Computer Programming is in the Programming Pathway and the Networking & Hardware Pathway.

Course Standards

INDICATOR # ACP 1. Utilize problem solving skills in a programming environment.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>

Level 3: Strategic Thinking	ACP 1.1 Demonstrate the ability to compile, apply problem solving to debugging and executing programs.	
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INDICATOR # ACP 2 Employ advanced conventions for creation and design of a software program.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	ACP 1.1 Demonstrate the ability to compile, apply problem solving to debugging and executing programs.	
Level 3: Strategic Thinking	ACP 2.2 Examine software development processes.	
Level 2: Skill/concept	ACP 2.3 Implement the syntactical components of a program.	

INDICATOR # ACP 3 Properly use language-fundamental commands and operations independently.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	ACP 3.1 Demonstrate the ability to use basic elements of a specific language.	
Level 3: Strategic Thinking	ACP 3.2 Employ basic arithmetic expressions in programs.	
Level 3: Strategic Thinking	ACP 3.3 Demonstrate the ability to use data types in programs.	
Level 3: Strategic Thinking	ACP 3.4 Incorporate functions/methods.	

INDICATOR # ACP 4. Apply control structures.

<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	ACP 4.1 Demonstrate the ability to use relational and logical operators in programs.	
Level 4: Extended Thinking	ACP 4.2 Investigate conditional statements.	
Level 4: Extended Thinking	ACP 4.3 Implement loops in programs.	

INDICATOR # ACP 5. Integrate arrays.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	ACP 5.1 Demonstrate the ability to use arrays in programs.	
Level 3: Strategic Thinking	ACP 5.2 Demonstrate the ability to use strings in programs.	

INDICATOR # ACP 6. Implement object-oriented programming techniques.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	ACP 6.1 Demonstrate the ability to use existing classes.	
Level 4: Extended Thinking	ACP 6.2 Demonstrate the ability to create user-defined classes.	
Level 4: Extended Thinking	ACP 6.3 Demonstrate proper design principles with classes.	

Web Development

Career Cluster	Information Technology
Course Code	10201
Prerequisite(s)	Foundations of Technology (recommended) Introduction to Information Technology (recommended) Computer Science Essentials (recommended)
Credit	.5-1
Program of Study and Sequence	Web Development 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	Information Technology Cluster Endorsement; Web & Digital Communications Pathway Endorsement; Arts, AV Technology & Communications Cluster Endorsement; K-12 Educational Technology Endorsement; K-12 Classroom Technology Endorsement
Resources	

Course Description:

Web Development I is a course designed to guide students in a project-based environment implementing web development techniques. Using hypertext markup language (HTML5) coding and Cascading Style Sheets (CSS) 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.

Program of Study Application: Web Development 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.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 1: Recall	WD 1.1 Identify the infrastructure required to access the Internet.	
Level 1: Recall	WD 1.2 Summarize Internet development and functions.	
Level 1: Recall	WD 1.3 Recognize the purpose of domains.	
Level 2: Skill/Concept	WD 1.4 Define the function of a Domain Name Server (DNS).	
Level 1: Recall	WD 1.5 Define important Internet communications protocols and their roles in delivering basic Internet services.	
Level 1: Recall	WD 1.6 Demonstrate knowledge of standard copyright rules.	
Level 2: Skill/Concept	WD 1.7 Explain the use and purpose of acceptable use policy (AUP).	

INDICATOR # WD 2. Demonstrate creation of web pages.

<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	WD 2.1 Demonstrate knowledge required to create a web page.	
Level 2: Skill/Concept	WD 2.2 Demonstrate appropriate file structure and naming.	
Level 2: Skill/Concept	WD 2.3 Create web pages with appropriate HTML structure and standards that can be validated using World Wide Web Consortium validator (W3C).	
Level 3: Strategic Thinking	WD 2.4 Demonstrate the use of elements and attributes.	
Level 2: Skill/Concept	WD 2.5 Incorporate meta tags for page documentation and search engine optimization (SEO).	

INDICATOR # WD 3. Format web pages using Cascading Style Sheets (CSS).		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	WD 3.1 Apply essential aspects of the CSS.	
Level 2: Skill/Concept	WD 3.2 Apply CSS to a website.	
Level 3: Strategic Thinking	WD 3.3 Use basic selectors in a CSS.	

INDICATOR # WD 4. Plan, design, implement, and maintain website(s).
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<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	WD 4.1 Analyze project requirements.	
Level 3: Strategic Thinking	WD 4.2 Plan site design and page layout.	
Level 4: Extended Thinking	WD 4.3 Create basic content for website.	
Level 4: Extended Thinking	WD 4.4 Edit and revise a site.	

INDICATOR # WD 5. Explore careers in Web Development.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 2: Skill/Concept	WD 5.1 Explore Information Technology (IT) Web Development careers.	
Level 2: Skill/Concept	WD 5.2 Demonstrate job skills for programming industries.	

PROPOSED

Advanced Web Development

Career Cluster	Information Technology
Course Code	10201
Prerequisite(s)	Computer Applications Introduction to Information Technology (recommended) Computer Information Technology (recommended) Web Development
Credit	.5-1
Program of Study and Sequence	Advanced Web Development is in the Programming Pathway and the Web & Digital Communication 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	Information Technology Cluster Endorsement; Web & Digital Communications Pathway Endorsement; Arts, AV Technology & Communications Cluster Endorsement; K-12 Educational Technology Endorsement; K-12 Classroom Technology Endorsement
Resources	

Course Description:

Advanced Web Development 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. Advanced Web Development reviews and builds on the concepts introduced in Web Development including live production and scripting.

Program of Study Application: Advanced Web Development is in the Programming Pathway and the Web & Digital Communication Pathway

Course Standards

INDICATOR # AWD 1. Demonstrate creation of a website for a real-world application.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	AWD 1.1 Create a website.	
Level 3: Strategic Thinking	AWD 1.2 Develop appropriate file structure and naming.	
Level 3: Strategic Thinking	AWD 1.3 Create website with appropriate HTML structure and standards that can be validated using World Wide Web Consortium validator (W3C).	
Level 3: Strategic Thinking	AWD 1.4 Demonstrate the use of elements and attributes.	
Level 3: Strategic Thinking	AWD 1.5 Incorporate meta tags for page documentation and search engine optimization (SEO).	
Level 4: Extended Thinking	AWD 1.6 Implement advanced elements to create a website.	

Indicator # AWD 2 Format website using Cascading Style Sheets (CSS).		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	AWD 2.1 Apply essential aspects of the CSS.	

Level 3: Strategic Thinking	AWD 2.2 Apply CSS to a website.	
Level 4: Extended Thinking	AWD 2.3 Use selectors in a CSS.	
Level 4: Extended Thinking	AWD 2.4 Format page layout with advanced CSS.	

INDICATOR # AWD 3. Plan, design, implement, and maintain website(s).		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	AWD 3.1 Analyze project requirements.	
Level 3: Strategic Thinking	AWD 3.2 Develop site design and page layout utilizing best practices.	
Level 4: Extended Thinking	AWD 3.3 Create content for website.	
Level 4: Extended Thinking	AWD 3.4 Upload and maintain a site.	

INDICATOR # AWD 4. Explore advanced web concepts.		
<i>Webb Level</i>	<i>Sub-Indicator</i>	<i>Integrated Content</i>
Level 3: Strategic Thinking	AWD 4.1 Demonstrate the use of scripting and other interactive tools.	
Level 2: Skill/concept	AWD 4.2 Explore other web technologies.	