

Colorado CTE Course – Scope and Sequence

Course Name	IT 2 (Information Technology Level 2)	Course Details	1.0		
		Course = 0.50 Carnegie Unit Credit			
Course Description	The Information Technology (IT) Level 2 course builds upon foundational IT knowledge gained at the beginner level, delving deeper into advanced concepts and practical applications. This course is designed to enhance students' proficiency in various IT domains, fostering a deeper understanding of hardware, software, and networking components. students will have an enhanced understanding of advanced IT concepts and will be well-prepared to pursue further studies or enter the workforce with a solid foundation in information technology. (CSTA Standards)				
Note:	This is a suggested scope and sequence for the course content. The content will work with any textbook or instructional resource. If locally adapted, make sure all essential knowledge and skills are covered.				
SCED Identification #		Schedule calculation based on 60 calendar days of a 90-day semester. Scope and sequence allow for additional time for guest speakers, student presentations, field trips, remediation, or other content topics.			
All courses taught in an approved CTE program must include Essential Skills embedded into the course content. The Essential Skills Framework for this course can be found at https://www.cde.state.co.us/standardsandinstruction/essentialskills					
Instructional Unit Topic	Suggested Length of Instruction	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration
Debugging & Deconstructing	7-14 days	CSTA Standards View full list on CSTA link. 2-AP-10 2-AP-11 2-AP-12 2-AP-13 2-AP-14 2-AP-15 2-AP-16 2-AP-17 2-AP-18 2-AP-19 3A-IC-25 3A-AP-21	<ul style="list-style-type: none"> • Breaking down complex problems into steps using abstraction and decomposition. • Creating models and flowcharts of computer software and hardware. • Writing pseudo code for programs. • Test and refine computational artifacts to reduce bias and equity deficits. 	2A-AP-10 Use flowcharts and/or pseudocode to address complex problems as algorithms. 2A-AP-11 Create clearly named variables that represent different data types and perform operations on their values. 2A-AP-12	Technology Student Association TSA , Skills USA Skills USA

				<p>Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.</p> <p>2-AP-13 Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs.</p> <p>2-AP-14 Create procedures with parameters to organize code and make it easier to reuse.</p> <p>2-AP-15 Seek and incorporate feedback from team members and users to refine a solution that meets user needs.</p> <p>2-AP-16 Incorporate existing code, media, and</p>	
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				<p>libraries into original programs, and give attribution.</p> <p>2-AP-17 Systematically test and refine programs using a range of test cases.</p> <p>2-AP-18 Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts.</p> <p>2-AP-19 Document programs in order to make them easier to follow, test, and debug.</p> <p>3A-IC-25 Test and refine computational artifacts to reduce bias and equity deficits.</p>	
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				3A-AP-21 Evaluate and refine computational artifacts to make them more usable and accessible.	
Circuits and EE	2-3 weeks	CSTA Standards 1B-CS-02 2-CS-01 2-CS-02 2-CS-03 3A-CS-01 3A-CS-02 3A-CS-03 3A-NI-04	<ul style="list-style-type: none"> • Writing programs to command and operate physical computer devices such as microcontrollers, sensors, and input detectors. • Bridging an understanding of how software commands physical electronics • Understanding how to troubleshoot problems with physical electronics by examining programming code. 	1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks. 2-CS-01 Recommend improvements to the design of computing devices, based on an analysis of how users interact with the devices. 2-CS-02 Design projects that combine hardware and software components to collect and exchange data.	Technology Student Association TSA Skills USA Skills USA

				<p>2-CS-03 Systematically identify and fix problems with computing devices and their components.</p> <p>3A-CS-01 Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.</p> <p>3A-CS-02 Compare levels of abstraction and interactions between application software, system software, and hardware layers.</p> <p>3A-CS-03 Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.</p> <p>3A-NI-04: Evaluate the scalability and</p>	
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				reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.	
Cybersecurity	14-21 days	<p><u>CSTA Standards:</u></p> <p>2-NI-04 2-NI-05 2-NI-06</p>	<ul style="list-style-type: none"> ● Examining how cryptography and ciphers ensure computer security ● Exploring multi-factor authentication as a protective computer solution. ● Interacting with ethical hacking and pen-testing scenarios ● Learn and understand the concepts of the five pillars of cybersecurity (confidentiality, integrity, availability, non-repudiation, and authentication) may include, but are not limited to, access control paradigms, accountability, authorization, least-privilege, and need-to-know. ● Troubleshooting strategies for software include but are not limited to, reverse engineering. 	<p>2-NI-04 Model the role of protocols in transmitting data across networks and the Internet.</p> <p>2-NI-05 Explain how physical and digital security measures protect electronic information.</p> <p>2-NI-06 Apply multiple methods of encryption to model the secure transmission of information.</p>	<p>Technology Student Association TSA</p> <p>Skills USA Skills USA</p>

			<p>Detecting adversarial behavior techniques may include, but is not limited to, threat hunting and basic troubleshooting steps triggering cybersecurity incident response scenarios.</p> <ul style="list-style-type: none"> • Computational thinking and Problem Solving - (Analyze and utilize strategies) • Analyze and utilize data through the use of computing devices (Data, Information, and Security) 		
Javascript Programming /Game App Design	14-21 days (2 Weeks)	<p><u>ISTE:</u> 1.d Develop a Growth Mindset.</p> <p><u>CSTA:</u></p> <p>2-AP-13 3A-AP-13; 3A-AP-14; 3A-AP-15; 3A-AP-16; 3A-AP-17; 3A-AP-18; 3A-AP-22;</p>	<ul style="list-style-type: none"> • Creating interactive game and art programs using a Javascript environment (Such as Code.org) • Understanding common programming concepts such as loops, conditional statements, and variables • Object-oriented programming on an X-Y coordinate plane. • Functional programming concepts: Pattern matching (matching patterns in a data structure where values can be used to enhance code by making it more maintainable and reducing 	<p>ISTE: 1.d Develop a Growth Mindset. Develop resilience and perseverance when approaching CS and CT learning experiences, build comfort with ambiguity and open-ended problems, and see failure as an opportunity to learn and innovate.</p> <p>2-AP-13 Decompose problems and</p>	<p>Technology Student Association TSA</p> <p>Skills USA Skills USA</p>

			<p>the chance of errors that relate to incorrect extraction of data.</p> <ul style="list-style-type: none"> • Leverage problem-solving strategies to solve problems of level-appropriate complexity • Problem-solving strategies that encompass computational thinking include abstraction, algorithm development, decomposition, and pattern recognition. 	<p>subproblems into parts to facilitate the design, implementation, and review of programs.</p> <p>3A-AP-17 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.</p> <p>3A-AP-18 Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.</p> <p>3A-AP-22; Design and develop computational artifacts working in team roles using collaborative tools.</p>	
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<p>Robotics</p>	<p>7-14 days (2 weeks)</p>	<p><u>ISTE</u></p> <ul style="list-style-type: none"> ● ISTE 1.d <p>CSTA:</p> <ul style="list-style-type: none"> ● 2-AP-10 ● 3A-AP-16 ● 3A-AP-17 ● 3B-AP-10 ● 3A-AP-21 	<ul style="list-style-type: none"> ● Modifying code parameters to experiment with robotics challenges such as sensing obstacles and distances ● Exploring careers and scenarios in modern robotics ● Identifying the purpose of robotics in industrialization ● Data Information and Security ● Utilize the engineering design process ● Develop schematics relevant to robotics system architecture ● Analyze and utilize collaborative methods in problem-solving of level-appropriate complexity ● Analyze and utilize level-appropriate troubleshooting strategies for hardware and software ● Classify and utilize types of information that are stored in robotics systems including, but not limited to, 2D and 3D coordinate systems and sensor data. 	<p>ISTE 1.d Develop a Growth Mindset. Develop resilience and perseverance when approaching CS and CT learning experiences, build comfort with ambiguity and open-ended problems, and see failure as an opportunity to learn and innovate.</p> <p>CSTA: 2-AP-10: Use flowcharts and/or pseudocode to address complex problems as algorithms.</p> <p>3A-AP-16 Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions.</p>	<p>Technology Student Association TSA</p> <p>Skills USA Skills USA</p>
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<p>Types of Machine Learning & Data Sets</p>	<p>14-28 days (2-4 weeks)</p>	<p><u>CSTA:</u></p> <ul style="list-style-type: none"> ● 2-AP-17 ● 3A-CS-02 ● 3A-NI-04 ● 3B-AP-08 ● 3B-AP-09 ● 3B-AP-10 	<ul style="list-style-type: none"> ● Server Virtualization Implementation: Design and implement a virtualization strategy using such technologies as VMware. ● Optimizing Network Infrastructure: Upgrading routers, switches, and implementing advanced security protocols ● Hardware Lifecycle Management: Implement backup strategies and conduct drills with real scenario-like events. 	<p>2-AP-17 Systematically test and refine programs using a range of test cases.</p> <p>3A-CS-02 Compare levels of abstraction and interactions between application software, system software, and hardware layers.</p> <p>3A-NI-04 Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.</p> <p>3B-AP-08 Describe how artificial intelligence drives many software and physical systems.</p> <p>3B-AP-09 Implement an artificial intelligence</p>	<p>Technology Student Association TSA</p> <p>Skills USA Skills USA</p>

				<p>algorithm to play a game against a human opponent or solve a problem.</p> <p>3B-AP-10 Use and adapt classic algorithms to solve computational problems.</p> <p>3B-AP-11 Evaluate algorithms in terms of their efficiency, correctness, and clarity.</p>	
IT Scenarios (Hardware)	2-3 Weeks	<p><u>CSTA:</u></p> <ul style="list-style-type: none"> ● 2-CS-02 ● 3A-CS-03 ● 3B-CS-01 	<ul style="list-style-type: none"> ● Server Virtualization Implementation <ul style="list-style-type: none"> ○ Design and implement a virtualization strategy using such technologies as VMware. ● Optimizing Network Infrastructure, Upgrading routers, switches, and implementing advanced security protocols ● Hardware Lifecycle Management; 		<p>Technology Student Association TSA</p> <p>Skills USA Skills USA</p>

			Implement backup strategies and conduct drills with real scenario-like events		
Software Scenarios	2-3 weeks	<p><u>CSTA:</u></p> <ul style="list-style-type: none"> ● 2-CS-02 ● 3A-CS-02 ● 3B-CS-01 	<ul style="list-style-type: none"> ● Integrate various enterprise-level software solutions (e.g., ERP, CRM, HRM). Ensure data consistency and security across integrated platforms ● Investigate and mitigate a security incident by analyzing logs, identifying vulnerabilities, and implementing corrective actions. 	<p>CSTA:</p> <p>2-CS-02 Design projects that combine hardware and software components to collect and exchange data.</p> <p>3A-CS-03 Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.</p> <p>3B-CS-01 Categorize the roles of operating system software.</p>	<p>Technology Student Association TSA</p> <p>Skills USA Skills USA</p>
Careers in IT	2-4 weeks		<p>Identify various fields within IT fields and their respective career opportunities.</p> <p>a. Recognize the work typically performed, tools and technology</p>		

