Florida Advanced Information Technology Syllabus

High School (165 Contact Hours)

Course Overview and Goals

This course covers key concepts in cybersecurity, IT systems, and creative technology development, providing students with hands-on experience in both theory and application. Beginning with an introduction to cybersecurity, students learn about personal data security, cyber ethics, and the tools and techniques used to prevent common cyber threats. As the course progresses, students dive deeper into IT concepts such as system administration, networking, and data security, developing critical skills in managing and troubleshooting both hardware and software systems. Through modules on web development using HTML and CSS, students gain practical experience in designing and styling websites, while Arduino programming modules help them explore physical computing and programming for interactive hardware projects. The course culminates in a final project where students use design thinking to create a personalized technology solution, integrating the skills and knowledge they have acquired throughout the course.

Learning Environment: The course utilizes a blended classroom approach. The content is a mix of web-based and physical activities. Students will investigate cyber-related topics, reflect on them and discuss them, create digital presentations, and engage in in-person collaborative exercises with classmates. The course allows for collaboration, with opportunities for peer feedback and group discussions. Teachers utilize tools and resources provided by CodeHS to leverage time in the classroom and give focused 1-on-1 attention to students.

Programming Environment: Students write and run HTML, CSS, and JavaScript files in the browser using the CodeHS editor. Because different browsers treat HTML and CSS differently, we highly recommend that all student computers use an up-to-date version of the Chrome browser. You can download an up-to-date version of Chrome for free here: https://www.google.com/chrome/browser/

Prerequisites: There are no prerequisites for this course.

Technology Requirements: To complete all activities and exercises in this course, students must have access to the 3rd party sites and tools listed here: 📄 FL Advanced IT Course Links

More information: Browse the content of this course at https://codehs.com/course/24932/explore/

Course Breakdown

Module 1: Cybersecurity and You (3 weeks/15 hours)

In this module, students delve into key areas such as personal data collection, the reliability of online information, cyber ethics and laws, personal data security, cybersecurity essentials, and strategies to combat common cyber threats and their prevention, equipping individuals with the knowledge to navigate the digital landscape responsibly and securely.

Browse the full content of this unit at https://codehs.com/course/24932/explore/module/34552

Topics Covered	- Digital Footprint and Responsibility - Personal Data Collection and Security - Cyber Ethics and Laws - Cybersecurity Essentials - Common Cyber Attacks and Prevention
Example Assignments	- Digital Footprint and Responsibility - Students explore the impact of social media and technology on teenagers, covering topics like digital footprints, the rise of social media screenings, cyberbullying, and the importance of updating privacy settings. - Personal Data Collection and Security - This lesson delves into the use and security of personal data, discussing how companies like Google utilize user information, the implications of location tracking, and legal aspects of privacy, and encourages critical thinking through reflections, checks for understanding, and explorations of browser security settings and the trade-offs of security measures. - Cyber Ethics and Laws - This lesson navigates through cyber ethics, differentiating between ethics and laws, exploring legal consequences, copyright in education, the process of obtaining permissions, and the pros and cons of intellectual property laws. - Cybersecurity Essentials - This lesson covers cybersecurity, featuring activities on the AAA Security Framework and the CIA Triad, along with exploring the impact of the Internet of Things on data security.

Module 2: System Administration (4 weeks/20 hours)

In this module, students will compare and contrast common operating systems (Windows, Linux, OS) and explain the importance of application security. They will investigate security options and implement user accounts to enforce authentication and authorization. Students will also demonstrate how to work with basic and advanced command prompts.

Browse the full content of this module at https://codehs.com/course/24932/explore/module/34553

Topics Covered	- Operating Systems - Software and Applications - Application Security - Browser Configuration - System Administration - Command Line Interface
Example Assignments	- Software Licenses *Do I Need a Software License?:* You have built a new picture-taking app complete with new original filters for iOS phones and you are

	excited to start selling it in the app store! Brainstorm and create a software agreement for your new app. ● System Administration 　○ *User Accounts:* You have been placed in charge of setting up your family's new computer. There should be four separate user groups - one for you and adult members of the family, one for your two middle school-aged siblings, a child account for your youngest sibling, and a guest account for family visitors. ● Setting Permissions 　○ *Shared Folders and Files:* Your principal would like your help setting up the folder structure for the high school. She would like to ensure that the students and teachers only have access to the correct folders. She also would like to make sure that students don't accidentally change, move, or delete files. The different types of files are listed below. What folders will you create to store these files? What permissions will you set for each folder? ● System Commands 　○ *Directory Directions:* You are teaching your friend how to use the command line interface. He has listed his steps and would like to know what he should type in the CLI for each one. Can you help him out?

Module 3: IT Concepts (4 weeks/20 hours)

In this module, students explore the structure and design of the internet and networks, and how this design affects the reliability of network communication, the security of data, and personal privacy. Students will learn how the Internet connects computers all over the world by use of networking protocols.

Browse the full content of this module at https://codehs.com/course/24932/explore/module/34554

Topics Covered	● Computers Speak Binary ● Encoding Text and Images in Binary ● IP Addresses ● Routing and Packets ● Protocols: TCP, UDP, HTTP/HTTPS ● How do Websites Work? ● OSI Model ● Impact of the Internet
Example Assignments	● Encoding Text in Binary 　○ *Write a Message in Binary:* In this activity, you will use ASCII encoding to write the same message in binary. Then, you will trade messages with a partner and use ASCII encoding to figure out your partner's message. ● OSI Model 　○ *Troubleshooting with the OSI Model:* You have been hired as a network engineer for Tea-Riffic Blends Co., a small business that sells specialty teas. You are in charge of setting up their network, configuring it, and solving any issues that arise. The OSI model can

	help with troubleshooting because it can isolate the layer causing the issue. Read through the following three scenarios. Based on the problem and what you know about the OSI layers, identify which layer you should target to solve the issue. Then, explain your reasoning. ● Impact of the Internet ○ *Compass Points: The Internet:* In this activity, students use the Compass Points thinking routine to examine their feelings about the Internet and its impact on society.

Module 4: IT Infrastructure (4 weeks/20 hours)

In this module, students will learn about the physical elements of computers and networking such as motherboards, RAM, routers, and the use of port numbers, ethernet, and wireless devices.

Browse the full content of this module at https://codehs.com/course/24932/explore/module/34555

Topics Covered	● Internal Components of a Computer ● Peripheral Devices ● Network Devices ● Storage and Network Options ● Network Communication ● Network Management

Example Assignments	● Network Devices
	    ○ *Network Troubleshooting:* Jamal's computer is able to connect to the Wi-Fi signal, but there is no Internet access. Which device do you think might be causing the problem and why?
	● Network Options
	    ○ *Wireless Network Setup:* In this activity, students will draw a diagram that represents a wireless network setup that will be implemented for a fictitious house, office, or apartment building. The teacher will either assign them a building or they can create one from their own imagination.
	● Network Management
	    ○ *SSH Logs:* Addison works as a server administrator and has been accused of stealing company financial data. He swears he is innocent. A search warrant has been granted for the company's network logs and you have been tasked with learning as much as possible about the attack and the attacker. Can you dig into the logs and help track down the hacker?

Module 5: Project: Harnessing Technology to Solve Problems (1 week/5 hours)

In this module, students will explore the systematic selection and integration of hardware and software components that represent a powerful approach to problem-solving in today's technology-driven world. Whether it's optimizing crop yields, enhancing athletic performance, or creating intelligent home systems, the synergy between hardware and software enables us to improve efficiency and address challenges.

Browse the full content of this module at https://codehs.com/course/24932/explore/module/34852

Topics Covered	● Technological innovations ● Integrating hardware and software ● Researching and defining a problem ● Developing a system/device prototype

Example Assignments	● Choose a topic and research the problem.
	   ○ What is the root of the problem?
	   ○ What are the needs of those experiencing the problem?
	   ○ What factors contribute to the problem?
	● Plan out what hardware and software your device will need
	   ○ Will the hardware need to communicate with software or another device?
	   ○ If your system will need data analytics, explain what type of analysis you need and why.
	● Draw a sketch of your prototype or create a physical prototype.
	● Pitch your innovation
	   ○ A pitch refers to a persuasive presentation that attempts to convince others about the value, benefits, and feasibility of a product, service, idea, or project. The goal of a pitch is to capture the attention of the audience, generate interest, and ultimately secure buy-in, funding, or support.

Module 6: Data Security (4 weeks/20 hours)

In this module, students will learn about the benefits and dangers of collecting and storing large sets of data. They will learn how to prevent attacks such as SQLi and XSS using programming controls. Students will also learn about risk management and how to identify, assess, prioritize, and minimize risks.

Browse the full content of this module at https://codehs.com/course/24932/explore/module/34557

Topics Covered	● Data as a Resource ● Databases ● Security in Coding ● Environmental Controls ● Risk Management

Example Assignments	● Databases
	   ○ *SQL Query Exploration:* In this activity, students will explore a database using the SQL query language.
	● SQLi
	   ○ *Can you gain access?:* The database in this item lists 100 of the most commonly used passwords. Attempt to gain access to a single record by guessing the password. Remember, this is a database of 100 of the most commonly used passwords. Can you guess at least 3 of them? How many can you guess?
	● XSS
	   ○ *XSS Tutorial:* In this activity, students will perform simulated Cross Site Scripting (XSS) attacks on vulnerable websites using

	unprotected input fields.
	● Security in Coding
	○ *Capture the Flag:* Within this lesson, students will have the opportunity to find "flags" by locating specific information using the View Page Source feature as well as other features that they will learn about.
	● Risk Management
	○ *CyberGuard High School:* You have just started a new job as the network administrator for CyberGuard High School. Throughout the next few activities, you will go through the Risk Management process to develop a Risk Management plan for CyberGuard High.

Module 7: Project: IT Professional (2 weeks/10 hours)

In this project, students will explore cybersecurity career pathways and build skills needed within these fields such as communication. In this project, students will explore the troubleshooting methodology and utilize it to solve sample IT support issues.

Browse the full content of this module at https://codehs.com/course/24932/explore/module/34556

Topics Covered	● Troubleshooting Methodology
	    ○ Identify the problem
	    ○ Research past solutions
	    ○ Establish a theory
	    ○ Test the theory
	    ○ Establish a plan of action
	    ○ Implement the solution
	    ○ Verify functionality
	    ○ Document findings
	● Cybersecurity Career Pathways
	● Customer Service and Communication
	● Contributing to a Knowledge Base
	● Creating an Instructional Video

Example Assignments	● *Troubleshooting:* In this project, students will learn more about each step of the troubleshooting methodology and use these steps to repair and improve faulty network systems.
	    ○ Poor Signal Strength
	    ○ Interference
	● *Act it out!:* Pair up with a partner and create a short script of a customer support scenario based on a common mobile device issue.
	● *Write a KB Article:* Create an internal knowledge base article that will be shared with other technicians.
	● *Star in a Video!:* Create a 2-5 minute video tutorial based on a common mobile device issue

Module 8: HTML - Structuring Websites (3 weeks/15 hours)

Students learn about the language behind all websites: HTML. Students learn about several different HTML tags as well as the basic structure of a web page. Students use HTML to develop several of their own creative web pages.

Browse the full content of this module at https://codehs.com/course/24932/explore/module/34559

Objectives / Topics Covered	● How do we build web pages? ● Markup Languages ● HTML ● HTML tags ● HTML attributes ● HTML elements ● The Anatomy of an HTML page ● Formatting text ● Hyperlinks ● Images ● Copyright fair use ● Lists ● Nesting tags ● Tables ● Styling with HTML ● HTML Colors
Assignments / Labs	● Students create several web pages to practice each of the concepts above ● Example exercises: 　○ Modify existing web pages using formatting tags to make text more readable 　○ Use links to create a web page linking to your 5 favorite websites 　○ Use links and images to create a personal library web page showing your favorite books 　○ Use lists and images to create a flashy list article 　○ Use tables to create a personal calendar web page 　○ Use styling attributes to add style to your web pages

Module 9: CSS - Styling Websites (2 weeks/10 hours)

Students learn the language CSS and use it to style their web pages. Students learn about the benefits of styling with CSS and will use CSS to create several styled web pages of their own.

Browse the full content of this module at https://codehs.com/course/24932/explore/module/34560

Objectives / Topics Covered	● How do we style web pages? ● CSS vs HTML ● CSS Selectors ● Selecting by tag ● Selecting by class ● Selecting by id ● The Cascade (order of selector precedence)

Assignments / Labs	● Students create several web pages to practice each of the concepts above
	● Example exercises:
	   ○ Use CSS selectors to style your previous web pages
	   ○ Use CSS selectors to style new web pages
	   ○ Create a music library web page and use CSS to style each song in your table
	   ○ Use CSS styling to make several images fit together properly
	   ○ Explain the benefits CSS provides over styling with only HTML
	   ○ Identify CSS selectors and rules used on example web pages

Module 10: Intro to Arduino (1-2 weeks/5-10 hours)

Students go through the basics of the Arduino device, such as how to light up and change the brightness of LEDs, and learn how variables can be used to write more versatile programs. Students build circuits to control LEDs and motors with the Arduino and explore how pseudocode can be used to structure programs from the start.

Browse the full content of this unit at https://codehs.com/course/24932/explore/module/34804

Objectives / Topics Covered	● Intro to physical computing ● Goal Setting ● Comments ● Pseudocode ● Analog vs. digital ● Variables ● Breadboards ● Potentiometers ● Debugging

Example Assignments / Labs	● 5 explorations
	● 12 exercises total
	● Example exercises:
	   ○ Morse Code
	     ■ Send a message using Morse code and your LED.
	       ● Think of one letter you want to send. Translate the letter to Morse code. Make the LED blink to match the Morse code translation. Switch programs with a friend and translate each other's letter!
	   ○ Opposite Blinking LEDs
	     ■ Blink two LEDs opposite one another. One LED should be lit while the other is off. After 1 second, the lit LED should turn off and the unlit LED should turn on. After 1 second, they should switch again. This should continue until the program is manually ended
	   ○ One Bright, One Fading
	     ■ Turn a yellow LED on while a red LED fades. The yellow LED should turn on and the red LED should be set to a brightness

	of 250. The yellow LED should stay on for two seconds. Every half a second, the red LED should decrease brightness by 50. After two seconds, both LEDs should be off for a second. This should continue until the program is manually ended

Module 11: Creative Development (2-4 weeks, 10-20 hours)

Students learn the theory and practice of user interface design. Students learn about what makes an engaging and accessible user interface and will employ an iterative design process including rapid prototyping and user testing to design and develop their own engaging projects.

Browse the full content of this unit at https://codehs.com/course/24932/explore/module/34767

Objectives / Topics Covered	● Design Thinking ● Prototyping ● Improving prototypes based on peer feedback ● Testing with Users ● Presenting final projects

Example Assignments / Labs	● Students learn about design thinking and create prototypes before presenting final projects.
	● Example exercises:
	    ○ Design Thinking Case Studies
	    ○ Wizard of Oz Prototyping
	    ○ User Testing
	    ○ Improving Prototypes
	    ○ Using Online Collaboration Tools

Supplemental Module: Program Control with Arduino (2-3 weeks/10-15 hours)

Students learn how to apply control structures, such as if/else statements and loops to create programs that will react to the outside world. They build programs that use sensors to detect temperature, light, and distance and make decisions based on the information collected.

Browse the full content of this unit at https://codehs.com/course/24932/explore/module/34563

Objectives / Topics Covered	● For loops ● While loops ● Variables ● If statements ● If/else statements ● Using buttons ● Using motors ● Operators (arithmetic, comparison, and logical) ● Using sensors (ultrasonic range finder, light sensor, temperature sensor) ● Functions and parameters
Example Assignments / Labs	● 5 explorations ● 10 exercises in total

	● Example exercises: 　○ Blinking Based on Potentiometer 　　■ Blink an LED at a speed based on the value of the potentiometer. If the potentiometer reads a value below 500, blink the LED on and off for a quarter second each. If the potentiometer reads a value above 500, blink the LED on and off for a half second each. 　○ Servo Sweep with Reset 　　■ Slowly increase the position of the servo (increasing by 1 degree every 100ms is a good speed) until it reaches 180 degrees. If at any point Button A is pressed, set the servo back to 0 for 1 full second and then start the process over again. 　○ Distance Warning Lights 　　■ No LEDs should be lit if an object is detected 15cm or farther from the ultrasonic range finder. If an object is detected closer than 15 cm, light only a green LED. If an object is detected closer than 10 cm, light only a yellow LED. If an object is detected closer than 5 cm, light only a red LED.