Tennessee Coding I Course Syllabus

High School - One Year (140 hours)

Course Overview and Goals

The Tennessee Coding I course introduces students to the fundamentals of computer programming. The course focuses on standard programming techniques, logical problem-solving, and creating simple applications. By the end, students will be able to plan multistep solutions, write and revise code, translate workflows into programming instructions, and troubleshoot/debug software for proper execution.

Learning Environment

The course utilizes a blended classroom approach. The content is fully web-based, with students writing and running code in the browser. Teachers utilize tools and resources provided by CodeHS to leverage time in the classroom and give focused 1-on-1 attention to students. Each unit of the course is broken down into lessons. Lessons consist of video tutorials, short quizzes, example programs to explore, and written programming exercises, adding up to over 100 hours of hands-on programming practice in total. Several units end with a comprehensive unit test that assesses students' mastery of the material from that unit as well as challenge problems where students can display their understanding of the material.

Development Environment

Students write and run HTML, CSS, and JavaScript in the browser using the CodeHS editor. Due to the fact that 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

Following state requirements, we recommend students complete the CodeHS Tennessee Computer Science Foundations course before taking Coding I.

Technology Requirements

To complete all activities and exercises in this course, students must have access to the 3rd party sites and tools listed here: Tennessee Coding I Course Links

More Information

Browse the content of this course at https://codehs.com/course/25295/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/25295/explore/module/35793

Topics Covered	• Digital Footprint and Responsibility • Personal Data Collection and Security • Cyber Ethics and Laws • Cybersecurity Essentials • Common Cyber Attacks and Prevention
Example Assignments	• 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.

Module 2: JavaScript Basics (1 week/5 hours)

In this module, students are introduced to the basics of JavaScript, including variables, user input, and mathematics.

Browse the full content of this unit at https://codehs.com/course/25295/explore/module/35796

Topics Covered	• Variables • User Input • Arithmetic Expressions • Constants • Collaborative Programming • Random Numbers • Functions

Example Assignments	• 12 JavaScript programming exercises in total
	  ○ Example exercise: Dinner Plans
	  Prompt the user for their name, then ask them what time you should meet for dinner. Greet them by their name and tell them you will meet them at the time they specified!

Module 3: The Canvas and Graphics (1 week/5 hours)

In this module, students are introduced to basic graphics and image representations.

Browse the full content of this unit at https://codehs.com/course/25295/explore/module/35796

Topics Covered	• JavaScript Canvas • JavaScript Graphics • Positioning Graphics Objects
Example Assignments	• 7 JavaScript programming and graphics exercises in total

	○ Example Exercise: Create Your Own Meme In this exercise, you are going to create your own meme! The only requirements are that you add at least one image and one text element.

Module 4: Graphics Challenges (1 week/5 hours)

In this module, students will learn how to pair-program! They will also take all the foundational concepts from JavaScript Graphics to solve some programming challenges.

Browse the full content of this unit at https://codehs.com/course/25295/explore/module/35892

Topics Covered	• Solving large and more complex problems using graphics.
Example Assignments	• 3 graphics challenges to tie everything in the JavaScript & Graphics module together ○ Example exercise: Ghost Write a program to draw a ghost on the screen. You must do this by using the constant values given (this will allow us to easily alter the size or color of the ghost.)

Module 5: 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 3 enforce authentication and authorization. Students will also demonstrate how to work with basic and advanced command prompts.

Browse the full content of this unit at https://codehs.com/course/25295/explore/module/35794

Topics Covered	• Operating Systems • Software and Applications • Application Security • Browser Configuration • System Administration • Command Line Interface
Example Assignments	• System Commands ○ Example exercise: 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 6: Control Structures (3 weeks/15 hours)

In this module, students learn how to use control structures such as if/else statements and loops to make more advanced programs in JavaScript.

Browse the full content of this unit at https://codehs.com/course/25295/explore/module/35829

Topics Covered	• Booleans • If/Else Statements

	• Logical Operators • Comparison Operators • Conditionals • While Loops • Break Statements • For Loops • Nested Control Structures
Example Assignments	• 31 control structures programming exercises in total • Using comparison and logical operators to control the flow of the program ○ Example Exercise: Inventory Write a program that keeps track of a simple inventory for a store. While there are still items left in the inventory, ask the user how many items they would like to buy. Then print out how many are left in inventory after the purchase. You should use a while loop for this problem. Make sure you catch the case where the user tries to buy more items than there are in the inventory. In that case, you should print a message to the user saying that their request isn't possible. • Using for loops ○ Example Exercise: Jukebox In the days before the internet, many restaurants would have a jukebox that allowed customers to choose what music they want to play. Customers would enter a coin and choose from the jukebox's music collection by selecting a song's number. You could choose one song per coin. In this exercise, you will create a digital jukebox where the user can enter any number of quarters to create a playlist of songs. • Drawing basic graphics using JavaScript ○ Example Exercise: Caterpillar This graphics program should draw a caterpillar. A caterpillar has NUM_CIRCLES circles. Every other circle is a different color, the even circles are red, and the odd circles are green (by even we mean when i is an even number). Use a for loop to draw the caterpillar, centered vertically on the screen. Also, be sure that the caterpillar is still drawn across the whole canvas even if the value of NUM_CIRCLES is changed.

Module 7: Functions (2 weeks/10 hours)

In this module, students focus on functions in programming, The module includes lessons on parameters, return values, default parameters, and scope.

Browse the full content of this unit at https://codehs.com/course/25295/explore/module/35831

Topics Covered	• Parameters • Return Values • Default Parameters • Scope
Example Assignments	• 12 functions programming exercises in total • Using various kinds of functions such as functions with and without

	parameters, and functions with and without return values ○ Example Exercise: Is it even? Write a program that continually asks the user for integers and then prints whether their input is even or odd. The user should keep entering numbers until they enter 0; at that point, print "Done!" on its own line. In order to check if the inputted integer is even or odd, you should define and call a function named `isEven()`. This function should return a Boolean value of `true` or `false` depending if the number is even or not.

Module 8: 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 unit at https://codehs.com/course/25295/explore/module/35795

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 9: Project: Engineering Design Process (3 weeks/15 hours)

In this project, students will learn the theory and practice of the engineering design process. This project allows students to think creatively about the applications of the concepts covered in the course, and create something of personal value.

Browse the full content of this unit at https://codehs.com/course/25295/explore/module/35965

Topics Covered	• Design Thinking • Prototyping • Testing • Project Prep and Development

Example Assignments	• Using Data
	  ○ Creating a Survey
	  ○ Data Cleaning
	  ○ Comparing Datasets
	  ○ Drawing Conclusions
	• Prototyping and User Testing
	  ○ Wizard of Oz Prototyping
	  ○ How to User Test Responses

Module 10: Arrays (1 week/5 hours)

This module explores arrays, covering topics such as introduction to arrays, adding and removing elements from an array, iterating through an array (with and without graphics), and array methods.

Browse the full content of this unit at https://codehs.com/course/25295/explore/module/35830

Topics Covered	• Intro to Arrays • Adding & Removing from an Array • Iterating Through an Array • Array Iteration with Graphics • Array Methods
Example Assignments	• Title of an activity from each lesson ○ Description of activity

Module 11: Objects (2 week/10 hours)

In this module, students will be introduced to object-oriented programming. They will learn what objects are and how to work with them, including creating graphic objects and using object methods. Students will also learn how to iterate through objects, use object constructors, and write programs that use objects.

Browse the full content of this unit at https://codehs.com/course/25295/explore/module/35894

Topics Covered	• Intro to Objects • Graphic Objects • Object Methods • Iterating Through an Object • Object Constructors
Example Assignments	• Exploration: Our Solar System ○ This activity involves fixing a JavaScript program that simulates planetary orbits by adding a missing line of code to associate each

	planet's graphical representation with its object. After correcting the program, the user is encouraged to explore the animation mechanics and add Mars as a fourth planet.

Module 12: Software Development (3 weeks/15 hours)

In this module, students will learn and use the software development life cycle to create a simple app that will solve an everyday problem.

Browse the full content of this unit at https://codehs.com/course/25295/explore/module/35893

Topics Covered	• Software Development Life Cycle • Prototyping • Using Flowcharts • User Testing • Software Licenses
Example Assignments	• Example Exercise: Create a Flowchart ○ Create a flowchart that visualizes the flow of your app. You can use paper or a digital tool to create your flowchart. This flowchart will still be a draft - you can always come back and edit it later on as you continue development! • Example Exercise: Test Your App! ○ Now that you have a plan, you are ready to conduct your user testing! You should have at least two different users test your app. In the editor, submit the data you collect during testing. This could be a link to images, videos, or a text