CodeHS

Tennessee Computer Science Foundations Syllabus
1 year for High School (140 contact hours)

Course Overview and Goals

The Tennessee Computer Science Foundations course introduces students to the core concepts of computing, programming, and digital literacy. Through hands-on projects and interactive modules, students explore web design, cybersecurity, cloud computing, data analysis, and advanced coding concepts. This course provides a strong foundation in computational thinking, problem-solving, and digital ethics, preparing students for further studies and careers in technology.

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 files 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/

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 Computer Science Foundations Course Links

Prerequisites: There are no prerequisites for the Tennessee Computer Science Foundations course.

More information: Browse the content of this course at https://codehs.com/course/25729

Course Breakdown

Unit 1: What is Computing? (4 weeks / 20 hours)
Students dive into the history of computing, consider how computing impacts today's world, and learn about the various parts that make up modern computers.

Browse the full content of this unit at https://codehs.com/course/25729/explore/module/35684

Objectives / Topics Covered	• History of computers • What is a computer? • What is software? • What is hardware? • History of operating systems • Future of computing

Assignments / Labs	• History
	  ○ Find out when the first computers were created
	  ○ Research famous computer innovators
	  ○ What roles do computers play in your life?
	  ○ Example Activity:
	  ■ Summarize an era of advances in computers
	• Software/Hardware
	  ○ What's the difference?
	  ○ What hardware components make up a computer?
	  ○ What is software used for?
	  ○ Example Activity:
	  ■ Label the parts of your computer
	• Future of computing
	  ○ Research uses of Artificial Intelligence in use now
	  ○ Research new ways of storing data
	  ○ Example class activity:
	  ■ In what ways can we use technology that we couldn't 10 years ago. Are these technological advances helpful or harmful overall?

Unit 2: Electrical Circuits (2 weeks / 10 hours)
Students learn the basics of electrical circuits and electrical principles such as Ohms law. Students explore these concepts using an online circuit simulator.

Browse the full content of this unit at https://codehs.com/course/25729/explore/module/35685

Objectives / Topics Covered	• Understand basic lab and electrical safety • Create basic electrical circuits • Understand, calculate, and see Ohm's law in action

	● Calculate energy and power of an electrical circuit ● Use logical gates to model real-life scenarios
Assignments / Labs	● Example exercises: ○ Basic lab safety ○ Exploring the multimeter ○ Exploring Ohm's Law ○ Calculating Ohm's Law ○ Logical AND and OR chips exploration

Unit 3: Web Design (4 weeks / 20 hours)
Students learn the basics of HTML, CSS, and the processes involved in viewing web pages on the internet. Students create several simple web pages using the CodeHS online editor to gain practice!

Browse the full content of this unit at https://codehs.com/course/25729/explore/module/35727

Objectives / Topics Covered	● How do we build web pages? ● Markup languages ● HTML ● HTML tags ● HTML attributes ● HTML elements ● The structure an HTML page ● Formatting text ● Hyperlinks ● Images ● Copyright fair use ● Lists ● CSS Styling
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 styling attributes to add style to your web pages ● Students create a keyboard short cut table in a project-based assignment

Unit 4: Project - Create a Website (3 weeks / 15 hours)
Students build their own websites about themselves. This site will be accessible on their own custom domain and will be continually improved by the student as they continue on in the course. It will serve as a running portfolio of each creative project they create in the course.

Browse the full content of this unit at https://codehs.com/course/25729/explore/module/35687

Objectives / Topics Covered	● The use of software development teams ● Using planning to create a website ● Developing a website based on customer input ● Building a website using teamwork
Example Assignments / Labs	● Brainstorming project ideas ○ Using a mind map to come up with ideas ○ Creating and executing a customer survey ● Planning a website development ○ Creating a site map ○ Creating a project timeline ● Building a website to feature an Innovation

Unit 5: Digital Information (3 weeks / 15 hours)
Students learn about the various ways to represent information digitally including number systems, encoding data, programmatically creating pixel images, comparing data encodings, compressing, and encrypting data.

Browse the full content of this unit at https://codehs.com/course/25729/explore/module/35688

Objectives / Topics Covered	● Understand how data is stored in computers ● Translate numbers between multiple number systems ● Troubleshooting computer issues
Assignments / Labs	● Intro to digital information ● Number systems ○ Binary ○ Hexidecimal ● Data compression ○ Lossy compression ○ Lossless compression ● Research the different steps of the troubleshooting process

Unit 6: The Internet (3 weeks / 15 hours)
Students explore the structure and design of the internet, and how this design affects the reliability of network communication, the security of data, and personal privacy.

Browse the full content of this unit at https://codehs.com/course/25729/explore/module/35689

Objectives / Topics Covered	● Understand how the Internet works ● Research different jobs in the Internet field ● Explain the impacts of copyright laws and how the Internet impacts these ● Introduction to cybersecurity

Assignments / Labs	• Internet hardware • IPv4 vs IPv6 • How does DNS work? • Route tracing • Sequential, parallel & distributed computing • The Impact of the Internet • Careers and ethics in the Internet age

Unit 7: Cloud Computing (3-4 weeks / 15-20 hours)
Students explore the past, present, and future of Cloud computing in this module through a variety of exploration exercises.

Browse the full content of this unit at https://codehs.com/course/25729/explore/module/35974

Objectives / Topics Covered	• What is cloud computing • History of cloud computing • Cloud deployment models • The Internet of things
Example Assignments / Labs	• Cloud computing case study • Project: History of cloud computing • Researching cloud computing deployment models • Smart devices in your life

Unit 8: What is Cybersecurity? (2 weeks / 10 hours)
Students explore the basics of cybersecurity. Students learn about why cybersecurity is important, recent threats to cybersecurity, and different careers in the field.

Browse the full content of this unit at https://codehs.com/course/25729/explore/module/35691

Objectives / Topics Covered	• What is cybersecurity? • Impact of cybersecurity • The CIA triad

Assignments / Labs	• What is cybersecurity?
	  ○ Summarize and discuss recent cyber attacks
	  ○ Explore a threat map to see where cyber attacks are coming from and which countries are being targeted
	• Impact of cybersecurity
	  ○ Review resources and reflect on or discuss
	  ■ What information do cyber criminals steal?
	  ■ What do cyber criminals do with stolen information?
	• The CIA Triad
	  ○ What is the CIA triad? (confidentiality, integrity, availability)
	  ○ What are secure systems?

	○ What do confidentiality, integrity, and availability mean in cybersecurity? ○ Example activities: ■ Determine where scenarios break part of the CIA Triad

Unit 9: Data (1 week / 5 hours)
Students explore using computational tools to store massive amounts of data, manipulate and visualize data, find patterns in data, and pull conclusions from data.

Browse the full content of this unit at https://codehs.com/course/25729/explore/module/35692

Objectives / Topics Covered	● What is data science? ● Visualizing and Interpreting data ● Collecting data and data limitations
Assignments / Labs	● Getting started with data ● Data collection ● Example activities: ○ Visualizing and interpreting data ○ Data survey collection reflection

Unit 10: Advanced Coding Concepts (2 weeks / 10 hours)
Students explore various computer programming advanced concepts such as file management, command line prompts, and shell scripts.

Browse the full content of this unit at https://codehs.com/course/25729/explore/module/35693

Objectives / Topics Covered	● Creating websites with multiple files ● Command line interface ● Automating command prompts with shell scripts ● Parts of the software development lifecycle
Assignments / Labs	● File management for website ○ Using multiple files/folders ● Network management ○ SSH logs ○ Mac and Windows command prompt simulators ● System commands ○ cd, ls, mk etc ● Shell scripts ○ Basic commands ○ Executing programming scripts ● Software development lifecycle ○ Parts of the development lifecycle ○ How GitHub works