Florida Coding Fundamentals Syllabus

Middle School (75 Contact Hours)

Course Overview and Goals

In the Florida Coding Fundamentals course, students will explore fundamental concepts of computing, programming, and data management. They will start with the basics of programming using Karel, enhancing their problem-solving and computational thinking skills while creating algorithms and coding solutions. As they progress, students will explore system administration, gaining insights into operating systems and effective configuration practices. They will explore the intricacies of the internet, cybersecurity, and the ethical considerations of digital communication. Additionally, students will investigate steganography and develop essential spreadsheet skills for data analysis. By the end of the course, students will be well-prepared to navigate and contribute to the complexities of the digital world responsibly and effectively.

Learning Environment

The course utilizes a blended classroom approach. The content is a mix of web-based and physical activities. Each module of the course is broken down into lessons. Lessons are composed of short video tutorials, interactive learning pages, quizzes, explorations, simulations, and free-response prompts.

Technology Requirements

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

Prerequisites

The Florida Coding Fundamentals course is designed for complete beginners with no previous background in computer science. The course is highly visual, dynamic, and interactive, making it engaging for those new to computer science.

More Information

Browse the content of this course at https://codehs.com/course/24996/overview

Course Breakdown

Module 1: Introduction to Programming (6 weeks/30 hours)

In this module, students will use Karel, a dog that can move, turn left, and place tennis balls, to explore the fundamentals of programming and enhance their computational problem-solving skills. They will discover the importance of programming languages and their applications, learn to write programs to tackle computational challenges, design algorithms, and analyze various potential solutions.

Browse the full content of this unit at https://codehs.com/course/24996/explore/module/34692

Topics Covered	• Commands

	• Functions • Abstraction • Control Flow • Looping • Conditionals • Commenting Code • Top Down Design

Example Assignments	• More Basic Karel
	  ○ *Pyramid of Karel:* Write a program to have Karel build a pyramid. There should be three balls on the first row, two in the second row, and one in the third row.
	• Functions in Karel
	  ○ *Pancakes:* Karel is the waiter and needs to deliver a stack of pancakes to the guests on the 2nd, 4th, and 6th columns. Each stack of pancakes should have three pancakes. Create a function called *makePancakes()* to help Karel solve this problem. The world should end up exactly as shown here.
	• Top Down Design and Decomposition in Karel
	  ○ *The Two Towers:* In this program, Karel should build two towers of tennis balls. Each tower should be 3 tennis balls high. At the end, Karel should end up on top of the second tower, facing East.
	• Control Structures Example
	  ○ *Random Hurdles:* Write a program that has Karel run to the other side of the first row, jumping over all of the hurdles. Karel should only jump if there is a hurdle blocking the way. However, the hurdles can be in random locations. The world is fourteen columns long. Students must write a function named *jumpHurdle()* as part of their solution.

Module 2: Karel Challenges (2 week/10 hours)

In this module, students will learn the value of collaboration and the challenges it presents when working together to solve programming problems. They will also develop essential teamwork skills and enhance their coding communication skills.

Browse the full content of this unit at https://codehs.com/course/24996/explore/module/34728

Topics Covered	• Solution Planning • Crafting Solutions • Decomposition • Function Utilization • Control Structures • Code Readability • Conditions • Commenting • Top-Down Design

Example Assignments	• Karel Challenges
	  ○ *Fetch:* There is a ball up on a shelf. Karel starts off on the floor and needs to go up to the shelf to fetch the ball and bring it back to the start.
	  ○ *Racing Karel:* Karel's world is a racetrack and Karel is going to run a race. Write a program to get Karel to move around the racetrack eight times, and end up back at the starting location. Every time Karel hits a corner, put a ball down, so at the end, there are 8 balls on each corner.
	  ○ *Tower Builder:* Karel starts on the first row and first column. Your job is to build a tower (a stack of 3 tennis balls) on all of the odd columns in the world. i.e. 1st, 3rd, 5th, 7th, etc. This must work on any sized world, so there could only be 1 column or there could be 100 columns, and it should still build a tower on every odd column.

Module 3: System Administration (2 weeks/10 hours)

In this module, students will explore the fundamentals of system administration, focusing on operating systems and their functionalities. Through theoretical lessons and hands-on labs, students will learn about different types of operating systems, their upgrade processes, and how to configure computer settings for optimal performance. By the end of the module, students will have the skills to navigate system administration effectively and troubleshoot common issues.

Browse the full content of this unit at https://codehs.com/course/24996/explore/module/34695

Topics Covered	• Operating Systems • Computer Configuration • File Systems • Device Comparison • Software Types and Applications • User Account Management • System Security Practices • Backup and Recovery

Example Assignments	• Operating Systems
	  ○ *Windows Update Simulation:* In this activity, students will follow steps to complete an update for a simulated device with a Windows OS. Once they see the homescreen, they have successfully completed the update!
	• Comparing Operating Systems
	  ○ *macOS vs. Windows OS:* Read through this article to learn about the differences between macOS and Windows OS. Then, explore the simulations and answer the 'Check For Understanding' questions that follow. Wondering about Linux? Linux is extremely unique and in a category of its own. You'll have a chance to explore the Linux operating system in the next activity!
	• Laptops and Tablets

	○ *Laptop vs. Tablet:* Using the information in the article, create an organized chart that compares and contrasts laptops and tablets. The chart should include comparisons that span at least five different categories (such as processor, operating system, etc.). ● Software and Applications ○ *A Variety of Applications:* There are applications and software for nearly everything! Below is Jeremiah's phone. Click on each app and explore the application simulation. What do you think Jeremiah uses each application for? You will answer a few reflection questions about some of these apps in the following item.

Module 4: Exploring the Internet (2 weeks/10 hours)

In this module, students will explore the fundamental concepts of the internet and its impact on communication and society. They will learn how computers use binary code to process information and understand the essential protocols that enable connectivity. Students will also investigate the importance of cybersecurity and the measures necessary to protect personal data in an increasingly interconnected world.

Browse the full content of this unit at https://codehs.com/course/24996/explore/module/34697

Topics Covered	● Language of Computers ● Binary Representation ● Introduction to the Internet ● Networking Basics ● Protocols ● Impact of the Internet ● The Internet of Things ● The CIA Triad ● Encryption Basics
Example Assignments	● Computers Speak Binary ○ *Bits and Bytes:* Read through this article and watch the video to learn about bits and bytes. In the next activity you will use your knowledge of bits to encode a message! ● Impact of the Internet ○ *Internet in My Daily Life:* Envision a normal day, from the time you wake up to the time you go to sleep. In what ways do you use the Internet during your day? For what purposes do you use the Internet? As you go through a normal day in your mind, write down all the ways you use the Internet. Include the device you use and the purpose. ● Cybersecurity ○ *Phishing Simulator:* Malware is a program that can damage a computing system. These programs can be downloaded due to user error when someone clicks on a dangerous link or downloads a malicious file. Explore this simulation. Examine the emails and decide whether they are legit or malicious.

Module 5: Project: Steganography (1 week/5 hours)

In this module, students will explore the fascinating world of steganography and its role in data encryption. They will learn how to conceal messages within images by manipulating hexadecimal color codes. In this process, students will develop their own encryption algorithms, gaining practical experience in applying steganographic techniques. By the end of the module, they will be able to define steganography and effectively use it to encrypt messages.

Browse the full content of this unit at https://codehs.com/course/24996/explore/module/34729

Topics Covered	• Steganography • Cryptography Basics • Hexadecimal Color Codes • Techniques for Hiding Data • Encryption • Ethical Considerations

Example Assignments	• Project: Steganography
	  ○ *Hidden Message:* Look at the picture and the corresponding color codes associated with the pixels. There is a message hidden in the first 12 pixels! Below is the method used to hide the message. Can you reverse the process and find the secret message?
	  ○ *Your Turn: Hide Your Message:* Now it's your turn to use steganography to hide a message in your own pixel picture!
	  ■ Step 1: Think of a short message that you'll want to hide. Your message should be a minimum of three words in length. Write the message in this item.
	  ■ Step 2: Devise an encryption method! Use the previous activity's encryption algorithm as a guide to create your own. You should use the Caesar Cipher and Number Substitution. Write your encryption method in this item.
	  ■ Step 3: Encrypt your message using your algorithm. Write the encrypted message in this item. You should end with a group of numbers that will be hidden in the pixel codes.
	  ○ *Your Turn: Image Creation:* Using the encryption algorithm that you created in the last activity, hide your message in a picture!

Module 6: Exploring Data and Spreadsheets (2 weeks/10 hours)

In this module, students will learn the basics of spreadsheet operations such as sorting, filtering, and applying formulas like average, median, and mode. They also learn how to create visualizations using the data in Google Sheets. They will create data dashboards, learn about data models, and complete the module with a data storytelling project.

Browse the full content of this unit at https://codehs.com/course/24996/explore/module/34696

Topics Covered	• Data as a Resource • Using Databases

	• Introduction to Spreadsheets • Sort and Filter • Statistical Measures • Models • Visualizing Data

Example Assignments	• Sort and Filter
	  ○ *Influential Women:* In this exercise, students will learn about remarkable women who have made significant contributions in fields like Science, Literature, and Environmentalism, while having the opportunity to sort and filter data to uncover interesting facts and connections about these inspiring figures.
	• Statistical Measures
	  ○ *Mammal Statistics:* In this exercise, students will explore data on common mammals while calculating the mean, median, and mode of various data points to derive meaningful insights.
	• Visualizing Data
	  ○ *Create a Dashboard:* In this exercise, students will explore running analytics data and create an engaging running dashboard, a powerful tool that consolidates essential information and data visualizations in one place.
	• Project: Tell Your Story
	  ○ *Draft a Design:* For this activity, students will take time to explore data storytelling designs and draft their own story. They can create their infographic directly in the spreadsheet or sketch their design on paper, in PowerPoint, or using a program of their choice.