CodeHS

Arkansas Programming I (Python)
Course Syllabus

Course Overview and Goals

This is the level one computer science course for the state of Arkansas. It is designed to provide foundational understandings of concepts in computer science that are necessary for students to function in an ever-changing technological world. These standards help students learn to accomplish tasks and solve problems independently and collaboratively. These standards give students the tools and skills needed to be successful in college and careers, whether in computer science or in other fields.

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.

Programming Environment: Students write and run Python programs in the browser using the CodeHS editor.

More information: Browse the content of this course at codehs.com/course/18029

Prerequisites

The Arkansas Programming I 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 new coders.

Course Breakdown

Unit 1: Digital Citizenship and Cyber Hygiene (5 weeks/25 hours)
This unit focuses on why cybersecurity is important, recent threats to cybersecurity, and different careers in the field. It includes topics on Internet etiquette and how to stay safe on the world wide web. Students will also look at the potential effects of their digital footprints, how to protect information from online risks, and the implications of cyberbullying. Finally, the module includes how to find and cite quality resources online.

Browse the full content of this module at https://codehs.com/course/18029/explore/module/24944

Objectives / Topics Covered	• What is Cybersecurity? • The CIA Triad • Digital Footprint and Reputation • Cyberbullying

	• Internet Safety • Privacy and Security • Information Literacy • Visualizing and Interpreting Data • Data Collection and Limitations • Creative Credit and Copyright • Hacking Ethics • Project: Public Service Announcement

Example Assignments / Labs	• What is Cybersecurity?
	  ○ Why is cybersecurity important?
	  ○ How do we prevent cyber attacks?
	  ○ Example activities:
	  ■ Summarize and discuss recent cyber attacks
	  ■ Explore a threat map to see where cyber attacks are coming from and which countries are being targeted
	• The CIA Triad
	  ○ What is the CIA triad? (confidentiality, integrity, availability)
	  ○ Example activities:
	  ■ Determine where scenarios break part of the CIA Triad
	• Digital Footprint and Reputation
	  ○ What is a digital footprint?
	  ○ What does it mean that the internet is public and permanent?
	  ○ Example activities:
	  ■ What is your digital footprint?
	  ■ Are you going to make any changes in what you post on social media?
	• Cyberbullying
	  ○ What is cyberbullying?
	  ○ What are the impacts of cyberbullying?
	  ○ Example activities:
	  ■ Explore cyberbullying scenarios: What would you do?
	• Internet Safety
	  ○ What are some ways to stay safe online?
	  ○ Example activities:
	  ■ Explore Internet safety scenarios: What would you do?
	• Privacy and Security
	  ○ What are data privacy and security?
	  ○ How can you keep personal data secure and private?
	  ○ Example activities:
	  ■ Test out various passwords on a site
	  ■ Explore Google’s privacy policy: What do they know about you?
	• Information Literacy
	  ○ What is information literacy?
	  ○ How can you do effective internet searches?
	  ○ Example activities:
	  ■ Create and test search queries
	  ■ Explore the evidence for using sources
	• Creative Credit and Copyright
	  ○ What is copyright?
	  ○ What are the different types of copyright licenses

	○ Example activities: ■ Create citations for sources ■ Explore image search tools ● Hacking Ethics ○ Are there different kinds of hackers? (white, black, gray) ○ What are bug bounty programs? ○ Example activities: ■ Explore what penetration testing is ■ Sign an ethical hacker agreement ● Final project: Create a Public Service Announcement ○ Create a Public Service Announcement (PSA) to teach your peers about your selected topic in digital citizenship and cyber hygiene. You can select any of the topics covered in this module. Be creative and make it fun! You could make a video, song, poster, or slideshow.

Unit 2: Intro to Programming with Turtle Graphics (7 weeks/35 hours)

Browse the full content of this unit at https://codehs.com/course/18029/explore/module/25096

Objectives / Topics Covered	● What is a Command? ● Moving Tracy ● Tracy's Coordinate System ● For Loops ● Functions and Parameters ● Top Down Design ● Variables ● User Input ● If/else Statements ● While Loops ● Debugging ● Abstraction ● Collaborative Programming
Example Assignments / Labs	● Example exercises: ○ Row of Circles ■ In this program, Tracy should draw a row of circles across the width of the canvas using a for loop. ○ Circle Pyramid ■ Write a program that directs Tracy to draw a pyramid with 3 circles on the bottom row, 2 in the middle, and 1 on top. ○ Bubble Wrap 2.0 ■ In this program, you should have Tracy add highlights to each bubble from our Bubble Wrap example program. Use top down design to break this large problem into smaller pieces! ○ Rating ■ Write a program that shows a graphical representation of a user's rating value. If the value is between 1 and 4, draw a red X. If it is between 5 and 7, draw a yellow horizontal line. If it is an 8 or above, draw a green checkmark.

Unit 3: Networks and the Internet (3 weeks/15 hours)

This unit explores 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/18029/explore/module/24947

Objectives / Topics Covered	● Structure of the internet ● How network data is transmitted ● Hardware involved in the transmission of data ● How the internet has impacted everyday life ● Using the Command Line Interface (CLI)
Example Assignments / Labs	● Structure of the internet ○ Explore the differences between IPv4 and IPv6. Why are we running out of addresses? ○ Explore the different levels of the internet. ○ Example Activity ■ Trace a website request from the server, through the network, and to your computer ● How data is transmitted ○ How are internet packets able to find their way to your computer? ○ Explain in your own words how a request from your computer travels through the various levels of servers to reach and return the correct webpage and resources? ○ Example Activity: ■ As a class, create a protocol that will allow one classmate to send another classmate a note, without the need for talking to each other. ● Hardware involved ○ Explore the role of routers ○ Why are protocols so important? ○ Explore how data is able to be transmitted across the ocean by using underwater cables

Module 4: Project: Troubleshooting Project (1 week/5 hours)

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/18029/explore/module/25119

Objectives / 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
Example Assignments / Labs	● 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

Unit 5: Basic Python and Console Interaction (3 weeks/15 hours)

Browse the full content of this unit at https://codehs.com/course/18029/explore/module/25097

Objectives / Topics Covered	• Printing • Variables • Types • User Input • Converting Input Types • Arithmetic Expressions • String Operators • Comments • Graphics in Python

Example Assignments / Labs	• 18 exercises in total
	• Example exercises:
	  ○ Printing
	  ■ Print messages to the console
	  ○ Variables
	  ■ Create variables of different types, and print them to the console.
	  ○ Types
	  ■ Investigate the types of different variables
	  ■ Convert between types
	  ○ Arithmetic Expressions & Converting Input Types
	  ■ Age in One Year - Ask the user how old they are, and tell them how old they will be in one year
	  ■ Rectangle, part 1 - Make variables for length and width and compute area and perimeter
	  ■ Rectangle, part 2 - Ask the user for length and width and compute area and perimeter

Unit 6: Conditionals (2 weeks/10 hours)

Browse the full content of this unit at https://codehs.com/course/18029/explore/module/25098

Objectives / Topics Covered	• If Statements • Boolean Values • Logical Operators • Comparison Operators • Floating Point Numbers and “Equality”

Example Assignments / Labs	• 10 exercises in total
	• Example exercises:
	  ○ If statements and boolean values
	  ■ Is it raining? - Write a program that uses a boolean variable to determine whether or not it is raining
	  ○ Boolean operators, and expressions
	  ■ Boolean variable - Take a variable and use it in an if statement
	  ■ Legally allowed to vote - User reports age and program tells them whether or not they can vote in the US
	  ■ Transaction - User reports balance and deposit/withdrawal, and program prints new balance or error
	  ■ Recipe - Ask the user for ingredients, amounts per serving,

	and number of servings, and report the total amount of each ingredient needed

Unit 7: Looping (2 weeks/10 hours)

Browse the full content of this unit at https://codehs.com/course/18029/explore/module/25099

Objectives / Topics Covered	● While Loops ● For Loops ● Break and Continue ● Nested Control Structures
Example Assignments / Labs	● 11 exercises total ● Example exercises: ○ While Loops ■ Divisibility - Ask the user to enter a numerator and denominator, and re-prompt until the denominator is non-zero ○ For Loops ■ Average test score - Compute the average of several test scores ○ Break and Continue ■ Higher/ Lower - Ask the user to guess a particular number between 1 and 100. If the user's guess was too high or too low, they should be notified ○ Nested Control Structures ■ Rolling Dice - Print out all combinations that can be made when 2 dice are rolled

Unit 8: Functions and Exceptions (3 weeks/15 hours)

Browse the full content of this unit at https://codehs.com/course/18029/explore/module/25100

Objectives / Topics Covered	● Functions ● Namespaces ● Parameters ● Return Values ● Exceptions
Example Assignments / Labs	● 16 exercises total ● Example exercises: ○ Functions ■ Raining cats and dogs - Write functions to print text art of a cat and a dog ■ Temperature converter - write functions to convert from Fahrenheit to Celsius and vise versa ○ Exceptions ■ Temperature converter, part 2 - Add exception handling to your temperature conversion program ○ Putting it all together ■ Enter a positive number - Make a function to repeatedly ask the user to enter a number until they enter a positive number

Unit 9: Strings (3 weeks/15 hours)

Browse the full content of this unit at https://codehs.com/course/18029/explore/module/25101

Objectives / Topics Covered	• Indexing and Slicing • Math Operators on Strings • For Loops Over a String • String Methods

Example Assignments / Labs	• 14 exercises in total
	• Example exercises:
	  ○ Indexing
	  ■ First character - write a function that takes a string and returns the first character
	  ■ All but the first character - write a function that takes a string and returns everything but the first character
	  ○ Math operators and strings
	  ■ Full name - write a function that takes two strings (a first name and a last name) and returns a full name as a single string
	  ■ Replace a letter - write a function that takes a string and returns a copy with the character at a particular index replaced with a dash
	  ○ For loops on strings
	  ■ Count occurrences - write a function that takes two strings and returns the number of times the second string appears in the first string
	  ○ String methods
	  ■ Add enthusiasm - write a function that takes a string and returns that string in all upper case
	  ■ Remove all from string - write a function that takes two strings and returns a string that consists of the first string with all instances of the second string removed

Unit 10: Creating and Altering Data Structures (2 weeks/10 hours)

Browse the full content of this unit at https://codehs.com/course/18029/explore/module/25102

Objectives / Topics Covered	• Tuples • Lists • For Loops and Lists • List Methods

Example Assignments / Labs	• 12 exercises in total
	• Example exercises:
	  ○ Tuples
	  ■ Cookout Orders - Given a tuple of food orders, add up the number of burgers and number of hotdogs and print the total sums.
	  ○ Lists
	  ■ Listed Greeting - Ask a user to enter their name, age, and favorite sport, then split their response into list elements and use index values to greet them by name and respond that you enjoy that sport as well!
	  ■ Exclamat!on Po!nts - Ask the user for a string and then print

	the same string with every lowercase i replaced with an exclamation point. ■ Librarian - Ask the user for the last names of the authors of the five books they are returning. Print a list of those names in sorted order.

Unit 11: Extending Data Structures (3 weeks/15 hours)

Browse the full content of this unit at https://codehs.com/course/18029/explore/module/25103

Objectives / Topics Covered	● Dictionaries ● 2d lists ● List comprehensions ● Packing and unpacking ● Mutable vs. immutable ● Equivalence vs. identity
Example Assignments / Labs	● 13 exercises in total ● Example exercises: ○ Dictionaries ■ Phone book - user repeatedly enters name, and program either asks for the person's phone number or reports the phone number already provided ○ 2d lists ■ Checkerboard - write a program that prints the initial setup of a checkerboard, with a 1 where a piece would be and a 0 where a blank square would be

Unit 12: Project: Guess the Word (3 weeks/15 hours)

Browse the full content of this unit at https://codehs.com/course/18029/explore/module/25104

Objectives / Topics Covered	● Allow students to combine a variety of topics (strings, loops, booleans, user input, etc.) in a single program ● Introduce students to incremental development ● Strengthen debugging skills by having students develop a larger project ● Testing
Example Assignments / Labs	● Part 1 - store a secret word in a variable, ask the user for a guess, and report whether or not it is correct ● Part 2 - refine fetching guesses to check for invalid guesses and repeatedly ask until guess is valid ● Part 3 - allow the user to guess 10 times, and print a combination of dashes and correct guesses before each guess ● Part 4 - only penalize the user for incorrect guesses

Unit 13: Topics in Computer Science (1 week, 8 hours)

This unit introduces students to individual's contributions to the development of the computer and future developments of technology. Students explore applications of technology in Precision Agriculture, Artificial Intelligence, and other careers available in computer science.

Browse the full content of this unit at https://codehs.com/course/18029/explore/module/24955

Objectives / Topics Covered	● Invention of the Computer ● Precision Agriculture ● Future of Computing ● Computer Science Careers ● Inclusive Coding
Assignments / Labs	● Precision Agriculture: ○ What is Precision Agriculture ○ Drones and the Future of Farming ○ GPS Based Applications ○ Research: The Role of Precision Technology ● Emerging Technologies ○ Using DNA for Storage ○ Pros and Cons of AI ○ AI: Is It a Bad Thing? ● Computer Science Careers ○ Computer Science All Around Us ○ CS Careers ○ Coding in the Wild ○ Inclusive Coding

Supplementary Unit Guide:
These units can be used during the course for added practice or after the course has been completed for further review.

Supplementary Unit	**Prerequisite/Recommended Unit(s)**
Advanced Tracy Challenges	*Intro to Programming with Turtle Graphics*
Additional Topics - *Short Circuit Evaluation* - *De Morgan's Laws* - *Adding Text*	● *Short Circuit Evaluation - Conditionals* ● *De Morgan's Laws - Conditionals* ● *Adding Text - Turtle Graphics*
Project: Who Said It?	*Competed course*