

## **Intro to Programming**

UC/CSU "d" approved/*NCAA approval pending*

Grade Level: 9-12

Estimated Work Outside of Class: 1 hrs per week

### **Course Description:**

Semester 1 – This course is designed to introduce the student to the study and principles of computer programming using Python. Students will learn how to approach everyday problems and tasks scientifically and from a programmer's perspective. The class will focus on programming elements of Python, graphics, events, conditionals, functions, and motion. They will produce animated graphics using the Python programming language.

Semester 2 – This course will focus on building board games and will include local variables, random values, nested loops, parameters, as well as game design techniques. The final project will be the creation of a full board game.

The course will give students an introduction to programming logic and purpose.

### **Prerequisite:**

None

### **Recommended Prerequisite Skills:**

Problem solving skills, creativity, organization

### **Course Grade Categories:**

- Independent Practice/Classwork: 80%
- Tests/Quizzes/Final Assessment: 20%

### **Major Assessments/Units/Topics:**

Assessments per unit: 1-2 Quizzes, 1 Unit Test, In class Activities, Programming Projects

#### **Unit 1: Creating drawings**

- **The Basics**
  - Getting started
  - Position and Size
- **Colors**
  - Fills and Borders
  - Gradients
  - Opacity
- **Shapes**
  - Rectangles, Ovals, Regular Polygons
  - Polygons
  - Labels
- **Creative Project**
  - Simple and Advanced creative tasks

## **Unit 2: Functions, Mouse Events and Properties**

- **Functions**
  - Function basics
  - Running, Testing and Autograding functions
  - Multiple Parameters
- **Mouse Events**
  - Mouse press events
  - Using and debugging events
  - Variables
  - Mouse release events
- **Properties**
  - General Shape Properties
  - Shape Specific Properties
- **Creative Exercises**

## **Unit 3: Mouse Motion Events, Conditionals and Helper Functions**

- **Mouse motion events**
  - onMouseMove and onMouseDrag
- **Conditionals**
  - If statements
  - Multiple else-ifs
- **Helper Functions**
  - Helper functions

## **Unit 4: More Conditionals, Key Events and Methods**

- **More Conditionals**
  - if-elif-else statement
- **Key Events**
  - onKeyPress and onKeyRelease events
- **Methods**
  - Custom properties
  - Shape Methods 1
  - Shape Methods 2
- **Creative Exercises**

## **Unit 5: Complex Conditionals and More key Events**

- **Complex Conditionals**
  - Compound Conditionals
  - Nested Conditionals
- **More Key Events**
  - onKeyHold

## **Unit 6: Groups, Step Events and Motion**

- **Groups**
  - Groups
  - Group properties
- **Group Methods**
  - Group Methods
- **Step Events and Motion**

- Step Events
- Motion
- Special Types of Motion

#### **Unit 7: New Shapes, Local Variables, and For Loops**

- **New Shapes**
  - Arcs and Arrows
- **Local Variables**
  - Local Variables
- **For Loops**
  - For Loops
  - Looping through Groups

#### **Unit 8: Math Functions, Random Values and Nested Loops**

- **Math Functions**
  - More operators
  - More Math Functions
- **Random Values**
  - Random Values
- **Nested For Loops**
  - More For Loops
  - Nested For Loops

#### **Unit 9: Types, Strings and While Loops**

- **Types and Input**
  - Types
  - Input
- **Strings**
  - Looping and Indexing with Strings
- **String Methods**
  - String Methods
- **While loops**
  - While Loops

#### **Unit 10: Lists and Return Values**

- **Lists**
  - Lists
- **List Methods**
  - List Methods
- **Return Values**
  - More functions that return values
  - Writing functions that return values

#### **Unit 11: 2D lists and Board Games**

- **2D Lists**
  - Creating and using 2D lists
  - More with 2D lists
- **Board Games**
  - Writing Board Games
  - Tic Tac Toe
  - Battleship
  - 2048

#### **Unit 12: Final Project**

- **Final Project**

- Images
- Sounds
- Final Project