COMPUTER SCIENCE I

Programming & Software Development with Python

COURSE INFORMATION	INSTRUCTOR
Grade Level: 9th - 12th	**Michael Puckett, M.Ed.**
Credits: 1.0 Technology/Elective	michael@trceducation.com
Duration: 32 weeks (Full Year)	615-796-4632
Schedule: TBD	TennesseeRoboticsCenter.com
Prerequisites: CS Foundations or Algebra I	

CLASS STRUCTURE (1.5 Hours)

INSTRUCTION 45 minutes	CODING LAB 45 minutes

COURSE DESCRIPTION

This project-based course takes students deeper into programming with Python. Building on foundational concepts, students learn data structures, file handling, object-oriented programming, and software development practices. Three major projects—a game, a data visualization, and a web application—give students real portfolio pieces. This course prepares students for AP Computer Science, college-level programming, or the Java-based Robotics Engineering course.

REQUIRED TEXTBOOK

Python Crash Course: A Hands-On, Project-Based Introduction to Programming

Eric Matthes, 3rd Edition (No Starch Press, 2023)

ISBN: 978-1718502703

TIME COMMITMENT

In-class instruction and lab time	1.5 hours/week
Textbook reading (chapters assigned weekly)	1-2 hours/week
Coding assignments & project work	2-3 hours/week
TOTAL WEEKLY COMMITMENT	**5-7 hours/week**

COURSE UNITS (32 Weeks)

Unit	Topic	Weeks
1	**Python Fundamentals Review** Variables, data types, operators, strings, input/output	1-4
2	**Lists & Data Structures** Lists, tuples, dictionaries, list comprehensions, sorting	5-8
3	**Functions & Modules** Functions, arguments, return values, modules, importing, documentation	9-12
4	**Object-Oriented Programming** Classes, objects, attributes, methods, inheritance	13-16
5	**PROJECT 1: Alien Invasion Game** Pygame, sprites, collision detection, game loops, scoring	17-20
6	**PROJECT 2: Data Visualization** Matplotlib, Plotly, APIs, CSV/JSON data, real-world datasets	21-24
7	**PROJECT 3: Web Application** Django basics, models, templates, user accounts, deployment	25-28
8	**Capstone: Independent Project**	29-32

	Student-designed project, documentation, presentation, portfolio	

GRADING

Reading Quizzes	15%
Weekly Coding Assignments	20%
Three Major Projects (15% each)	45%
Capstone Project	20%

Grading Scale:

A: 90-100% | B: 80-89% | C: 70-79% | D: 60-69% | F: Below 60%

REQUIRED MATERIALS

- Laptop computer (Mac, Windows, or Linux recommended; Chromebook with limitations)
- *Python Crash Course* by Eric Matthes (3rd Edition)
- Python 3.x installed (free)
- VS Code or PyCharm (free)
- GitHub account (free, for portfolio)
- Notebook for pseudocode and planning

PATHWAY

CS Foundations → **Computer Science I** → Robotics Engineering (Java) or AP CS A

Students completing Computer Science I will have three portfolio projects and strong preparation for AP Computer Science A, college CS programs, or the Java-based Robotics Engineering course. The object-oriented programming foundation transfers directly to Java.

PORTFOLIO OUTCOME

By course end, students will have a GitHub portfolio containing:

- **A complete video game** (Pygame)
- **A data visualization project** using real-world data
- **A deployed web application** (Django)
- **An independent capstone project** of their choosing