

# Exploring Computer Science Course Overview

**Instructor:** Erin Cingel ([ecingel@orangeccsd.org](mailto:ecingel@orangeccsd.org) /216.831.8600 X 2007)

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## Description:

Exploring Computer Science is an introductory-level course for students new to programming and computer science. In this course, students will explore problem-solving strategies, software design, and the foundations of computer science (data structures, procedures, and algorithms). There are no course prerequisites for this course, although students should have basic familiarity with computers and software applications.

This course prepares students for continuing study in computer science (for example, AP Computer Science A and AP Computer Science Principles) and teaches how to think computationally and solve real-world problems, skills important to every 21st-century citizen. Careers and topics in computer science will be explored, including but not limited to the history of computing, medicine, entertainment, security, and science.

## Programming Language:

This course is taught using Python. Python is a general-purpose programming language and is a great language for novice programmers. It is most praised for its elegant syntax and readable code, and it's quite powerful. Python is used by many large organizations (Google and NASA for example) to do just about everything from building apps, analyzing data, system administration, and the list goes on.

## Course Structure:

**Why ProjectSTEM?** This course will utilize a *MOOC* (Massive Open Online Course) called ProjectSTEM. Advantages are video lessons and downloadable PowerPoints students can use to reinforce or review the material taught that day in class, and/or to learn new material in the event of an absence. In addition, ProjectSTEM offers formative and summative evaluations daily whereby the student receives immediate feedback on their understanding and progress. Areas of confusion will be clarified in class. Lastly, students can collaborate using the community forum.

## IDLE (Integrated Development Environment):

Introductory programming courses typically use a less complicated IDLE (compiler) to help the student learn the basics of the language, without the extra “bells and whistles” distracting the learner. As such, this course is designed to utilize an online IDLE called “CodeSkulptor” and through ProjectSTEM’s system. No downloading or installing is necessary, only access to the Internet. Students can save their work directly in ProjectSTEM or by creating a URL of the versions of their programs for use at home and in class. In the second level, one unit will utilize an IDLE that must be installed. However, all work for this unit will be completed in class.

## Learning Goals:

Upon successful completion of this course, your students should:

- Have the basic technical vocabulary of computer science.
- Understand basic principles of thinking and solving problems with computers and computation.
- Recognize and use fundamental elements of computer programs, such as commands, variables, conditionals, and loops.
- Understand the representation of data in computer memory.
- Design, plan, implement, and test programming projects.

## Typical Daily Lesson:

**Review:** Students typically begin daily lessons reviewing the previous day’s lesson and/or homework. This may be a short quiz to check for understanding, a short programming assignment, or simply reviewing/sharing the solutions to the previous night’s coding assignment.

**Reason:** Following the review, new material may be introduced. Students will have access to an alternative instructional video at home on the day’s lesson to use as a review, reinforcement, or to solidify understanding.

**Reinforce:** Typically at the end of each lesson, the class will begin a short coding example of the day’s lesson and/or quick multiple-choice questions. Additional assignments may be given as homework.

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## Topics:

### Term 1

**Unit 1:** Beginning in Computer Science

**Unit 2:** Number Calculations and Data

**Unit 3:** Making Decisions

**Unit 4:** Repetition and Loops

**Unit 5:** Final Project (animations)

### Term 2

**Unit 6:** Graphics

**Unit 7:** Functions

**Unit 8:** Arrays

**Unit 9:** 2D Arrays

**Unit 10:** Text and String Processing

**Unit 11:** HTML/Internet

**Final Project**

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## Grading:

Students are encouraged to review daily and organize their class PowerPoints and notes in a 3-ring binder. No additional supplies are necessary.

SUMMATIVE: Quizzes, Exams 40%

FORMATIVE: Labs and Coding Practice Assignments 50%

CITIZENSHIP: Homework, Discussions, Punctuality, and Participation 10%

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## Office Hours:

Time	Location
2:30- 3:00	Media Center or ROOM 7
Other days/times	By appointment - email Mrs. Cingel for individual day/time <a href="mailto:ecingel@orangeccsd.org">ecingel@orangeccsd.org</a>