

# Computer Science Principles

Mr. Harrington

<http://technologyclass.org>

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## Course Description:

Computer Science Principles (CSP) is the 2<sup>nd</sup> level course in a two-course series that is being offered at SHHS. There are two primary components to the class: **Academic** and **Career**. The academic component of the class provides the students with an in depth knowledge of Computer Science, the ability to program in Javascript and C++, and a hands on understanding of Artificial Intelligence. The students will also build, code and compete in robotics competitions with other schools and take part in a regional robotics competition. The course concludes by having the students design and build suspension bridges using 3D Printers. The career component of the course provides the students with tech internships with the school district's IT department, a guest speaker series provided by tech industry leaders and field trips to Google, NASA and Intel. This course builds upon the skills presented in Exploring Computer Science (ECS - 1<sup>st</sup> level course), and at the same time it is meant to keep the students excited and having fun.

## Course Content

### Phase #1: Robotics & Programming C++

Students will build and program a robot to compete in a number of games using a variety of sensors. Students will compete against Napa High in a number of robotic competitions. They will also be given the opportunity to take part in a regional Vex robotics competition that is held at Vanden High School in Fairfield.

### Phase #2: Computer Science

#### A. The Internet

Students will explore and mimic the structure and design of the internet and the implications of those design decisions.

#### B. Digital Information

Students will both explore mimic the way that digital information is encoded, represented and manipulated.

#### C. Intro to Programming and Algorithms

Students will learn the foundational concepts of computer programming (Java Script), in order to build interactive apps. The concepts learned in these lessons span all programming languages and tools.

#### D. Big Data and Privacy

Students will view both the positive and negative effects of how data is used in the world around them and understand the basics of how modern encryption works.

### Phase #3: Coding Apps

Students' will program in JavaScript in order to create a series of small applications. Students will design and create their own online game.

### Phase #4 Engineering & 3D Printing

Students' will research a classic American suspension bridge, create a composite drawing, design their own bridge on a CAD program and finally build and assemble their suspension bridge using a 3D printer.

## Careers

A major component of this class is to expose the students to many of the career opportunities available to them in the tech sector and to learn what it takes to become employed with many of these firms.

### Field Trips: (Not During Pandemic)

- NASA Ames Research
- Google
- Intel Museum & Computer Museum

### Internships:

- SHUSD I.T. – Students submit a cover letter.

### Guest Speaker Series:

- Tech leaders from a variety of fields visit the students and tell them about growing up, college, what they do and advice (Every Friday for eight weeks in the Spring).

## Class Structure

These classes are small and intimate. I actually sit in a circle with the students and present questions and problems for them to solve via discovery. Most of the learning and support comes from the students themselves as they work with their partners. The students will also access Code.org to engage in a number of realistic online simulations or interactive tutorials that will allow them to experience or practice many of the skills they are learning. Whether it be Programming, Robotics or Engineering, the students always get to engage in a personal project so that they can apply these new skills.

## Class Conduct

- Phones are not to be used or visible during class.
- The moment the bell rings be in your seat.
- Have fun, but please don't be a distraction to others learning.

### Also:

- Bathroom (Bladder Control) – Just ask.
- Roaming the Room – The only students who should be out of their seats are those who are helping others. If you want to help someone, just ask.
- Food & Drink – water is ok...anything else, please wait till class is over.
- Other Class Assignments – Other class assignments are not to be done during class time.

## Missed Assignment Guidelines

- You are responsible for all missed work due the day following your return.
- Late work will not be accepted unless previously authorized by the instructor.

### Availability:

Although I travel to RLS after I teach at SHHS in the mornings, I will always find a time to make myself available to assist you...just ask.

### Class Materials:

Pen, Pencil & Earbuds.

Grading Policy (Student's grade is a total of all the points accumulated during the course.)



### **Grading Scale**

94-100=A	80-83=B-
90-93=A-	77-79=C+
87-89=B+	74-76=C
84-86=B	70-73=C-