Computer Science Principles
Mr. Harrington
http://technologyclass.org

Course Description:
Computer Science Principles (CSP) is the 2nd 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 a mobile app. and a hands on understanding of Artificial Intelligence. The students will also build and program robots and compete in robotics competitions. The course concludes by having the students engineer suspension bridges using CAD programs and 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 and NASA and the Computer History Museum. This course builds upon the skills presented in Exploring Computer Science (ECS - 1st level course), and is designed to not only challenge them, but to keep the students excited and having fun.

Course Content

Phase #1: Robotics & Programming C++
Students will engineer and program (C++) a robot to compete in a number of games using a variety of sensors.

Phase #2: Computer Science

A. The Internet
Students will acquire a comprehensive knowledge of how the internet works.

B. Digital Information
Students will develop protocols and understand how digital information is encoded, compressed and transmitted..

C. Big Data, Encryption 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.

D. Exploring Generative AI
First, students will acquire an understanding of AI. Then they will learn to customize language models, apply system prompts, and finally create chatbots that will be designed to solve a variety of problems.

Phase #3: Developing Mobile Apps.
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. Students will eventually 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:
- NASA Ames Research
- Google
- Computer History Museum

Internships:
- Students can apply and be awarded an internship with the S.H.U.S.D. IT Department where they will acquire a broad range of hard and soft skills.

Guest Speaker Series:
- Tech leaders from a variety of fields visit the class and share their experience about growing up, college, what they do and advice.

Job Interviews:
- Students practice writing a Cover Letter & Resume and then take part in a Mock Interview.

Industry Certifications
- Students can take a test that will allow them to acquire an Industry Recognized Certification in Computer Science.

Class Conduct

- Phones are not to be used or visible during class. Phones are to be placed in hanging pocket by the door.
- 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.
- 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

- This is a self-paced class. It is designed so that if you are away, or you just need more time to work on a project, I will always except your work – my goal is for you to acquire and apply as many career related skills as possible.

Availability:

Half the day I am at either at RLS or SHHS. I will always find a time to make myself available to assist you…just ask.

Grading Policy

The class Grading Policy allows all of my students to move at their own speed and get credit for what they have achieved. As they complete certain projects, they get credit and when they complete the next project, their grade is raised to match their accomplishment. There is no subjectivity to this grading system and it's very clear to the student what they need to achieve to attain certain grades. The assignments build in complexity, so students must complete the "C" assignment before moving on to the "C+" assignment,

First Semester

C-: Build & Program a Robot: Maze
C: Program Robot Sensors: Bumper, Ultrasonic, Vision.
C+: Program Robot Sensors: Line/Color, & Puzzle.
B-: Program Controller, Rocket League, Dismantle Robot.
B: Protocols & Binary (U1Ch1L1-L6)
B+: Images, Lossy & Lossless (U1Ch1L7-L10)
A-: Understanding how the Internet Functions (U2Ch1L1-L7& Physical Network)
A: Pass The Internet Test

Second Semester

C-: Intro To App Design
C Programming: Variables & Conditionals
C+ Programming:Functions & Final Project
B- Big Data, Privacy & Encryption
B Exploring Generative AI (1)
B+ Exploring Generative AI (2)
A- Fusion: CAD/Fastcar.
A Suspension Bridge: CAD/Fusion, Print & Assemble