

## COMPUTER SCIENCE

### AP COMPUTER SCIENCE A (1 credit)

#### Grades: 11-12

The AP® Computer Science A course is equivalent to the first semester of a college level computer science course. The course involves developing the skills to write programs or part of programs to correctly solve specific problems. AP® Computer Science A also emphasizes the design issues that make programs understandable, adaptable, and when appropriate, reusable. At the same time, the development of useful computer programs and classes is used as a context for introducing other important concepts in computer science, including the development and analysis of algorithms, the development and use of fundamental data structures, and the study of standard algorithms and typical applications. In addition an understanding of the basic hardware and software components of computer systems and the responsible use of these systems are integral parts of the course.

**Technology Requirements:** Students must have access to a computer system that represents relatively recent technology (PIII). Schools need to have Java and BluJ software already installed on a designated machine(s) before the course starts and enough memory in their lab machines (128 MB) so that students will be able to compile and run Java and BluJ programs efficiently.

**AP Exam:** Exam fees are to be paid by the student. The individual school district orders the exam on behalf of the student and administers it.

**Pre-requisites:** Algebra I is required. Algebra II is highly recommended. Prior coding experience is highly recommended.

### FOUNDATIONS OF PROGRAMMING (.5 credit)

#### Grades: 9-12

Do you want to learn the skills required to be competitive in today's high tech workforce? Foundations of Programming (FoP) will teach students the fundamentals of programming using the computer language Python. The course provides students with the concepts, techniques, and processes associated with computer programming and software development. Students will also explore the many programming career opportunities available in this high-demand field.

**Required Materials:** A computer is required; tablets and Chromebooks can't be used for this course.

### JAVASCRIPT (.5 credit)

#### Grades: 9-12

In this course, students will learn how to start programming with JavaScript. Students will learn the basics of JavaScript including testing, functions, objects, arrays, loops, conditional code, operators and syntax basics. Students will learn timing and animations, and how to debug. The class will conclude with a robust project that incorporates everything they learned in the semester.

**Prerequisite:** Student **MUST** take Web Design before taking this course.

**PROGRAMMING WITH ALICE (.5 credit)****Grades: 9-12**

Alice is an innovative 3D programming environment that makes it easy to create an animation for telling a story, playing an interactive game, or a video to share on the web. Alice is a free software tool designed to be your first exposure to object-oriented programming. It allows you to learn fundamental programming concepts in the context of creating animated movies and simple video games. In Alice, 3-D objects (e.g., people, animals, and vehicles) populate a virtual world and you create a program to animate the objects. Alice is developed and supported at Carnegie-Mellon University with financial support from Oracle, Electronic Arts, Sun Microsystems, DARPA, Intel, Microsoft, NSF and ONR. The director of the project is Wanda Dann.

**PROGRAMMING WITH SCRATCH (.5 credit)****Grades: 9-12**

Learn to program with the visual computer programming language Scratch. Scratch was developed at MIT's Lifelong Kindergarten Group. It allows users to explore basic programming concepts while creating multimedia programs, games and simulations. This course will help users to learn basic programming concepts and problem solving skills and take a deeper dive into more complex concepts including variables, loops, string processing and lists.

***Requirement:** Students under age 13 require parental/guardian permission and email address. A computer is required; tablets and Chromebooks can't be used. Students must be able to download files to be used with the web-based programming in Scratch.*

**WEB DESIGN (.5 credit)****Grades: 9-12**

In this course, students will learn how to design a beautiful and functional website. Students will learn how to take their design and translate it into a live website using Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS) programming languages. HTML5 and CSS3 will be the standard versions used in the class. Students will understand design components of websites, including the use of color, layout and when to use different techniques, typography rules, and the importance of imagery. At the conclusion of the course, students will present a website to the class. Upon completion of this course, each student will have hands-on experience creating a fully functioning website.

***Requirements:** Student will be required to create a free account with Neocities.org and use it throughout this course.*