# Advanced Placement Computer Science Principles

## John Jay High School

## 2019-2020


## Teacher: Jocelyn Humphries

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**Course Overview**

AP-CSP is a survey course designed to introduce students to computer programming and computational thinking within the larger context of a wide variety of topics in computer science. The curriculum was developed through a joint process by the College Board, the National Science Foundation, and practicing teachers across America to address massive job shortages across all industries and salary levels.The curriculum addresses seven big ideas: creativity, abstraction, data, algorithms, programming, the Internet, and the global impact of computing.

In this course, students will learn to create entertaining and socially useful apps that can be shared with friends and family.

**Prerequisites**

85 or better in Geometry or
85 or better in another computer programming course:
CP1, Game Design, Mobile Application Design, or APCS-A (Java)

**Rank Weight** GPA * 1.10

**Course Outline**

**Unit 1: Preview and Setup**
Establish all accounts, e-portfolio, College Board account, class procedures, etc.

**Unit 2: Mobile Apps & Pair Programming**
Learn how to use AppInventor to make mobile apps for the Android platform
Graphical User Interface - screen design, component selection and layout
Block-based, event driven programming
Logic - using simple and compound conditionals with variables

**Unit 3: Understanding Graphics and Data storage Bit by Bit**
Convert binary, decimal, and hexadecimal values
Differentiate the algorithms of bitmaps, jpeg, and png file formats
Use simple lists and local data with TinyDb

**Unit 4: Animation, Simulation, and Modeling**

Write apps using random number generation, clocks and timers

**Create: Programming Performance Task #1**

Experience the Agile development process for creative design
Practice programming a socially significant app for the AP performance task

**Explore: Impact of Computing Innovations Performance Task**

This is the first submission for the AP Exam and worth 15% of the grade
Students will be provided with 8 days of class time to complete this task
Research and present the elements of a current technology using very current articles and computer science specific vocabulary

**Unit 5: Algorithms and Procedural Abstraction**

Design algorithms including classic search - bubble, merge, bucket and Radix
Refining understanding of when and why to use procedures, functions, and refactoring

**Unit 6: The Internet**

Topography - How the Internet is physically connected, routing, DNS
Communication standards - Packet switching, HTTP and TCP/IP
Cryptography - Caesar, Substitution, and Vigenere Ciphers
Cybersecurity - Encryption, Public keys, Private keys, SSL

**Unit 7: Lists, Databases, Data, and Information**

Process datasets using lists, indices and eventually parallel lists
Save data persistently on the local device and in the cloud
Explore and use big datasets available on government web servers
Implement the Google Map API with embedded “big data”

**Create: Programming Performance Task #2**

This is the second submission for the AP Exam and worth 25% of the grade
Students are provided with 12 days of class time to complete an app that demonstrates creativity, computational abstraction and a self-defined algorithm.

**Post AP Project**

Work in a team with the Agile development process and use Thunkable, Admob, and Amazon store to monetized and publish a socially significant app for Android and/or iOS.

**Class Procedures**

This course is taught in a computer lab. Students will be required to create a personal gmail for this course (or use an email account they already have). This will allow them use of a variety of internet-based tools that are unavailable on their @k12.wcsdny.org accounts including email responses from the sites. These sites include, but are not limited to: The College Board where they will submit work for AP exam credit; The Mobile CSP Curriculum and Portfolio; AppInventor and Thunkable, programming tools we will use to make apps; and optional sites for monetizing apps and publishing work: Admob and Amazon Appstore.

**ALL ACCEPTABLE USE AGREEMENTS MUST BE RETURNED TO SCHOOL PROMPTLY SO YOU DON'T GET KICKED OFF THE NETWORK.**

**Grading**

**Classwork** - will be given nearly every day. You are expected to work diligently during class to complete each assignment. If you fall behind either because you are struggling with the material or due to absence, you need to make up the work during your lunch, study hall, or after school. Deadlines for all assignments are posted on the Google class page. A portfolio template will allow all students to follow the syllabus in class and independently. It is YOUR RESPONSIBILITY to know the deadlines and complete your work on time.

**Projects** - This is not like other AP courses. In this course, the CollegeBoard requires schools to provide in-class time for research (8days) and coding (12 days) for projects that must be submitted to the CollegeBoard Portal in advance of the test. The advance projects are worth 40% of the overall AP grade. The test in May is 100 multiple choice questions and is worth 60%.

**G.P.A.** - will be determined by a running point total for each quarter. Classwork/homework will be assigned approximately 5 – 10 points for each day of effort required. Quizzes are approximately 20 – 30 points. Tests are 50 – 100 points, and projects are approximately 100 - 200 points depending upon the length and complexity. Each quarter, 10% of the grade is awarded for participation.

Student Name (print): _____

Student Signature: _____ Date: _____

Parent Signature: _____ Date: _____