

Course Title:	AP Computer Science Principles
Department:	Business/Technology
Course #:	7571
Grade Level/s:	10-12
Length of Course:	Year
Prerequisite/s:	Successful completion of Math I/Algebra I and Approval of Instructor
UC/CSU (A-G) Req:	G (Pending)

Brief Course Description: AP Computer Science Principles (AP CSP) introduces students to the foundations of modern computing. The course covers a wide range of foundational topics such as: programming, algorithms, the internet, big data, digital privacy/security and societal impacts. This course is unique in that it focuses on fostering student creativity and applying creative processes when developing computational artifacts. Students design and implement innovative solutions using an iterative process similar to what artists, writers, computer scientists and engineers use to bring ideas to life.

AP CSP is designed to be an entry-level class equivalent to a first-semester introductory college computer science course. Students will use computational tools to analyze and study data while working with large data sets to analyze, visualize and draw conclusions from trends. Students will also develop effective communication and collaboration skills. In addition, students will work individually and in peer groups to discuss and solve problems, write of the importance and impact of technology in their community, society and world.

Student fees are allowable for Advanced Placement examinations for the possibility of college credit, so long as (1) taking the exam is not a course requirement; (2) the exam results have no impact on a pupil's grade or credit in a course; and (3) eligible economically disadvantaged high school pupils who receive school district funding towards the exam fee shall pay the required AP reduced fees.

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I. GOALS

The students will:

- A. Understand the major components of computers and their applications
CTE Anchor Standards – Academics
- B. Use technology as a tool for problem solving
CTE Anchor Standards – Technology WS 11-12.6
- C. Understand ethical and societal issues related to computing and computing careers
CTE Anchor Standards – Problem Solving and Critical Thinking WS 11-12.7
- D. Understand real-world technology problems
CTE Anchor Standards – Responsibility and Flexibility SLS 9-10, 11-12.1
- E. Develop connections between mathematics and computer science
CTE Anchor Standards – Problem Solving and Critical Thinking WS 11-12.7
- F. Understand web design, data analysis, programming techniques and technologies
CTE Anchor Standards – Demonstration and Application
- G. Understand the effects and dynamics of computing developments
CTE Anchor Standards – Problem Solving and Critical Thinking WS 11-12.7
- H. Demonstrate appropriate use of technology in a variety of situations
CTE Anchor Standards – Demonstration and Application
- I. Demonstrate the ability to use a variety of job-related computer skills
CTE Anchor Standards – Demonstration and Application

II. OUTLINE OF CONTENT FOR MAJOR AREAS OF STUDY

Semester 1

- A. The Internet
 - 1. Binary packets
 - 2. Binary messages
 - 3. IP addressing and redundancy
 - 4. Routing, DNS and protocols
 - 5. Abstraction
 - 6. The internet and society

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- B. Digital Information
 - 1. Text compression
 - 2. Encoding images
 - 3. Interpreting visual data
 - 4. Communicating with visualization
 - 5. Cleaning data and making summary tables

- C. Algorithms and Programming
 - 1. Designing algorithms
 - 2. Procedural abstraction
 - 3. Writing functions
 - 4. Loops and documentation

Semester 2

- A. Big Data and Privacy
 - 1. Big data in the real world
 - 2. The cost of “free”
 - 3. Foundations of encryption
 - 4. Asymmetric and public key encryption

- B. Building Apps
 - 1. Designing event-driven apps
 - 2. User input and variables
 - 3. Boolean logic and conditionals
 - 4. While loops and arrays
 - 5. Simulations
 - 6. Functions
 - 7. Processing arrays

- C. Performance Tasks
 - 1. Creation of performance tasks
 - 2. Creation of exploration tasks

III. ACCOUNTABILITY AND DETERMINANTS

- A. Key Assignments
 - 1. Analysis of Algorithms - This assignment utilizes Khan Javascript programming to compute algorithms. These algorithms include: sequencing, selection, iteration and recursion. Classic computing algorithms will be covered and includes searching and sorting to develop a visual representation of their efficiency in terms of the number of operations. The assignment will also include computing algorithms using techniques like pseudocode. The evaluation of time efficiency of algorithms will be included in this assignment.

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2. **Data Identification and Collection** - This lesson covers data collection on the Internet to complete the Impact of Innovation Project. It focuses on the following Google services: search (general data gathering), web analytics (gathering data about website visitors) and forms (gathering data as surveys of people). Searching includes coverage of first-order logic used by Google in search queries. In addition to the concept of data collection, this assignment provides practical tutorials on searching, search engine optimization, installing and performing analysis with Google Analytics and creating Google forms.

The assignment includes: Google searches including meta-search symbols and advanced search. These searches will assist in the completion of the Impact of Innovation Project. This project includes collection and reflection of survey data from the Impact of Innovation Project.

- B. **Assessment Methods**
 1. Skill mastery and quality of work
 2. Classwork/homework
 3. Performance tasks
 4. Projects
 5. Presentations
 6. Quizzes
 7. Response questions
 8. Multiple choice tests
 9. End of unit exams
 10. Semester final exams

IV. INSTRUCTIONAL MATERIALS AND METHODOLOGIES

- A. **Required Textbook(s)**

None
- B. **Supplementary Materials**
 1. Code.org
 2. Mobile CSP
- C. **Instructional Methodologies**
 1. Teacher lectures/direct instruction
 2. Class discussions
 3. Cooperative learning
 4. Guided Inquiry
 5. Simulation activities
 6. Close reading
 7. Collaborative peer review
 8. Teacher and student lead inquiry
 9. Flowchart development
 10. Group project/presentations