Aviation High School 2024-2025

AP Computer Science Principles MKN11X

September 05, 2024 to June 26, 2025
Advanced Placement Exam Testing Dates – May 5-16, 2025

Teacher Information

Teacher	Email
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General Information

Course Description

AP Computer Science Principles introduces students to the foundational concepts of computer science and challenges them to explore how computing and technology can impact the world. Students learn to evaluate solutions and apply computer science to solve problems by developing algorithms and programs. Students will learn foundational coding skills (no prior coding experience is necessary). Students enrolled in the class will take the Advanced Placement Exam in the Spring.

Course Credits

Classes are 45-minutes daily for **two graduation credits**.

Expectations and Goals

Be Present. Attendance and punctuality are extremely important. You need to be in your assigned seat when the bell rings or you will be counted as late. Repeated absences or lateness will negatively impact your grade, as you may miss important lessons.

Be Responsible. Bring everything you'll need, such as paper, a pen, and work that's due. All homework is completed daily and submitted at the beginning of class. In math, concepts build on one another, so it is imperative that you practice and understand each new topic. Be ready to review old concepts at the beginning of the year and if they come up later in the semester. It is your responsibility to catch up if you miss an assignment. You are responsible for the consequences of your actions.

Be Respectful. You are expected to be courteous and respectful to all students, teachers, and guests. There will be no swearing, name-calling, or snide comments. Also, the use of technology at inappropriate times is rude, and repeated behaviors will result in a phone call home. Remember, you control your technology; it shouldn't control you.

Practice Integrity. Think for yourself. Always turn in your own work. Don't tell people the answers; explain the process to them so they can learn how to find the answer themselves. If you are willing to think deeply, take risks, and put in the effort, then you'll have a good school year. The effort you put in is directly related to the amount of gains you will make.

Course Information and Materials

Course Objectives (Aligned to Computer Science Principles Learning Standards)

Unit 1: Digital Information

Main Objectives:

- Represent data using multiple encoding schemes.
- Explain how data can be represented using bits.
- Translate between different bit representations of real-world phenomena, such as characters, numbers, and images.
- For binary numbers: a. Calculate the binary (base 2) equivalent of a positive integer (base 10) and vice versa. b. Compare and order binary numbers.
- Explain the consequences of using bits to represent data.
- Compare data compression algorithms to determine which is best in a particular context.
- Explain how the use of computing could raise legal and ethical concerns.

Unit 2:The Internet

Main Objectives:

- Model the role of protocols in transmitting data across networks and the Internet.
- Explain how computing devices work together in a network.
- Explain how the Internet and its protocols work.
- Model the role of protocols in transmitting data across networks and the Internet.
- Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.
- Describe issues that contribute to the digital divide.
- Explain how the use of computing could raise legal and ethical concerns.

Unit 3: Introduction to App Design

Main Objectives:

- Describe the purpose of a computing innovation.
- Identify input(s) and output(s) to a program.
- Create and innovate using an iterative design process that is user-focused, that incorporates implementation/feedback cycles, and that leaves ample room for experimentation and risk-taking.
- Design a program and its user interface.
- Systematically test and refine programs using a range of test cases.

Unit 4:Variables, Conditionals, and Functions

Main Objectives:

- Determine the value of a variable as a result of an assignment.
- Evaluate expressions that manipulate strings.
- Create clearly named variables that represent different data types and perform operations on their values.
- For relationships between Boolean values: a. Represent using logical operators. b. Evaluate expressions that use logic operators.
- For selection: a. Represent using conditional statements. b. Determine the result of conditional statements.
- For procedure calls: a. Write statements to call procedures. b. Determine the result or effect of a procedure call.

- Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.

Unit 5: Data

Main Objectives:

- Describe what information can be extracted from data and metadata.
- Extract information from data using a program.
- Identify the challenges associated with processing data.
- Create interactive data visualizations using software tools to help others better understand real-world phenomena.
- Explain how people participate in problem-solving processes at scale.
- Explain how bias exists in computing innovations.

Unit 6: Lists, Loops, and Traversals

Main Objectives:

- For list operations: a. Write expressions that use list indexing and list procedures. b. Evaluate expressions that use list indexing and list procedures.
- For algorithms involving elements of a list: a. Represent using iterative statements to traverse a list. b. Determine the result of an algorithm with list traversals.
- For data abstraction: a. Develop data abstraction using lists to store multiple elements. b. Explain how the use of data abstraction manages complexity in program code.
- For iteration: a. Represent using iteration statements. b. Determine the result or side-effect of iteration statements.
- For simulations: a. Explain how computers can be used to represent real-world phenomena or outcomes. b. Compare the use of simulations with real-world contexts.
- Justify the selection of specific control structures when tradeoffs involve implementation, readability, and program performance and explain the benefits and drawbacks of choices made.

Unit 7: Parameters, Return, and Libraries

Main Objectives:

- For procedure calls: a. Write statements to call procedures. b. Determine the result or effect of a procedure call.
- Develop procedural abstractions to manage complexity in a program by writing procedures.
- Create procedures with parameters to organize code and make it easier to reuse.
- Select appropriate libraries or existing code segments to use in creating new programs.

Unit 8: Create Performance Test

Main Objectives:

- 9 class hours are provided for students to work on their own project for the AP Exam
- This project makes up 30% of the AP exam.

Unit 9: Cyber and Global Impacts

Main Objectives:

- Describe the risks to privacy from collecting and storing personal data on a computer system.
- Explain how an effect of a computing innovation can be both beneficial and harmful.
- Explain how a computing innovation can have an impact beyond its intended purpose.
- Explain how unauthorized access to computing resources is gained.
- Explain how computing resources can be protected and can be misused.

Unit 10: Algorithms

Main Objectives:

- Represent a step-by-step algorithmic process using sequential code statements.
- For binary search algorithms: a. Determine the number of iterations required to find a value in a data set. b. Explain the requirements necessary to complete a binary search.
- For determining the efficiency of an algorithm: a. Explain the difference between algorithms that run in reasonable time and those that do not run in reasonable time. b. Identify situations where a heuristic solution may be more appropriate.
- Explain the existence of undecidable problems in computer science.
- Compare problem solutions that use sequential, parallel, and distributed computing.

Required Materials

All students must come prepared to class every day with at least two blue or black pens, pencils, and an 8 ½" by 11" notebook or loose-leaf binder for each subject. Students must have a separate notebook or section in their binder dedicated to each class they attend. Notebooks will be checked periodically, so it is important that students be neat and organized.

Attendance Policy

Students must attend class every day. If a student is out for three or more consecutive days, a note must be brought in to the student's Counselor on the day they return to class. It is the student's responsibility to make up all missed assignments or exams, even for excused absences.

Aviation High School Grading Policy

Homework - 20%

Classwork - 20%

Exams, Quizzes, & Projects - 60%

Assessment Policy

All classes will have a minimum of two assessments per marking period. All classes will have a midterm exam in January and a Final exam in June.

The unauthorized use of "AI" software on any assignment is considered plagiarism and will not be accepted. Students must produce their own work.

Make-Up Work Policy

Students may submit work up to 3 days beyond the assignment deadline. Students who were absent will have 3 days to submit missed assignments from the date they return. Any extension on late assignments beyond 3 days is entirely at the teacher's discretion and will need to be arranged by the student.

Google Classroom

Every class has a Google Classroom that is automatically created. Students must be able to access digital platforms and resources such as Google Classroom daily. Students will be required to complete coursework in Google Classroom, and parents can receive progress reports from Google Classroom to monitor their children's academic progress. We encourage parents to register for these updates.

Course Sessions and Period Length

First Day of Classes – Thursday, September 5, 2024

Last Day of Classes – Thursday, June 26, 2025

Period Length – 45 minutes

Course Specific AP Exam Date

May 15, 2025, 12 PM

Aviation High School Bell Schedule

Period	Start	End
Period 0:	**7:15**	**8:00**
Coat Collection:	**8:00**	**8:08**
Period 1:	**8:11**	**8:56**
Period 2:	**8:59**	**9:44**
Period 3:	**9:47**	**10:39**
Period 4:	**10:42**	**11:27**
Period 5:	**11:30**	**12:15**
Period 6:	**12:18**	**1:03**
Period 7:	**1:06**	**1:51**
Period 8:	**1:54**	**2:39**
Period 9:	**2:42**	**3:27**
Period 10:	**3:30**	**4:15**

Additional Information and Resources

After School Tutoring

Tutoring Schedules will be posted by the teacher onto Google Classroom. Students are expected to bring questions from their homework, classwork, or tests during the tutoring period.

Online Resources

- Google Classroom
- Code.org
- AP Classroom (CollegeBoard)
- Quizziz.com
- KhanAcademy