

AP[®] Computer Science Principles

Course Syllabus 2020-21



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Grade Level: 11-12

Course Length: 2 semesters

Credits: 1 credit

Prerequisites: Introductory programming course or consent of instructor.

Course Description: AP Computer Science Principles introduces the principles that underlie the science of computing and the development of computational thinking skills. Students will make connections between concepts in computing, apply abstractions in computation and modeling, communicate ideas about technology and computation, design a program to solve a problem or complete a task, analyze computational work, and work collaboratively to solve problems. Activities will be tied to five big ideas including creative development, data, algorithms and programming, computer systems and networking, and the impact of computing.

Course Details: The AP Computer Science Principles course is the college course equivalent of a first-semester introductory college course in computing. Successful completion of Algebra I is highly recommended. During both semesters, emphasis will be placed on building computer science (CS) vocabulary, discussion of current topics in CS, and CS theory. Vocabulary building as well as learning objective concepts and essential knowledge statements will be taught through a variety of individual and cooperative learning activities.

Course Goals and Outcomes:

Upon successful completion of this course, students will:

- Explore how computers store complex information like numbers, text, images and sound and debate the impacts of digitizing information.
- Learn about how networks promote communications and the Internet works and discuss its impacts on our cultures and the economy.
- Design your first application while learning both fundamental programming concepts and collaborative software development processes.
- Expand the type of applications you can create by adding the ability to store information, make decisions, and better organize programming code.
- Design and analyze algorithms to understand how they work and why some are considered better than others.
- Learn how to design clean and reusable code that you can share with a group or the world.
- Practice and complete the Create Performance Task (PT).
- Develop a working vocabulary of a broad range of computer science topics.
- Explore and visualize datasets from a wider variety of topics as you hunt for patterns and try to learn more about the world around you.
- Research and debate historical and current innovations and explore events at the intersection of data, public policy, law, ethics, and societal impact.

Course Outline:

Unit 1: Laying the Groundwork – *(Ethical Issue – The Digital Divide)*

Unit 2: The Communication Layer – *(Ethical Issues – Social Networking)*

Networking, Internet and WWW, Computer Security

Unit 3: The Information Layer – *(Ethical Issues – FISA Court, Snowden Revelations, Privacy)*

Numbers, Computing, Data Representation

Unit 4: The Programming Layer – *(Ethical Issues – Software Piracy, Open-Source)*

Low-Level Languages, Abstraction,

Unit 5: The Operating System / Application Layer – *(Ethical Issues – Medical Privacy HIPPA)*

Operating Systems, File Systems, Big Data, Spreadsheets, Database Systems

Unit 6: Artificial Intelligence – *(Ethical Issues – Gaming and Addiction)*

Artificial Intelligence, natural Language Processing, Modeling, Gaming

Unit 7: **Computational Performance Task – 12 class period of 2.5 weeks prior to the AP Exam deadline to work on this major assessment component. (occurs between Unit 6 and Unit 8.)**

Unit 8: Limits on Computing – *(Ethical Issues – Therac-25 the Anatomy of a Disaster)*

Hardware and Software Limits, Problem Limits

Textbooks:

- Dale, Nell and John Lewis. *Computer Science Illuminated*. 7th ed. Burlington, MA: Jones & Bartlett Learning, 2020. (CS Illuminated)
- Ableson, Hal, Ken Ledeen and Harry Lewis. *Blown to Bits: Your Life, Liberty, and Happiness After the Digital Explosion*. 1st ed. Addison-Wesley, 2008. <http://www.bitsbook.com/excerpts/>

AP Computer Science Principles Performance Tasks (for AP Exam preparation)

- Create Performance Task documentation
- Course at a Glance (PDF) is a visual organizer of the AP Computer Science Principles curriculum

Additional Resources:

- Access to a computer running Windows or Mac OS X
- Access to the Internet
- Advanced Placement Computer Science Principles Course Description ([PDF website link](#))
- APCSP Student Handout including Exam Reference Guide ([PDF website link](#))
- A College Board student account to access the AP Classroom
- Snap! At snap.berkeley.edu – *A block-based programming environment to get students comfortable with programming quickly.*
- Python Software “Python IDLE” at www.python.org – *Python also resembles the APCSP pseudo-code closely and makes this transition easy for students as they prepare for the End-Of-Course AP Exam.*
- Repl.it website integrated development environment – *This website will be used for individual and group code assignments. Repl.it supports multiple languages that are used in this class.*

Evaluation and Grading Scale:

Assignments: Each graded activity in the course is assigned a certain number of points. The course percentage grade will be determined by comparing the points earned out of points possible and then converting to a letter grade based on the grading scale below. Late assignments will lose points for being late. A student's current grade in the course will be available as we progress.

Assignment Categories:

Vocabulary

- Each chapter includes a list of vocabulary words. Students will be expected to write and match definitions for each of these word in the context of computer science.

Exercises

- Each chapter includes exercises connected to the textbook readings. Students will be expected to complete these exercises. The point totals for each assignment will vary depending on the number of exercises and estimated time for those exercises assigned.

Activities

- Students will be assigned activities to complete including simulations and programming laboratories. These may include writing programs, answering application questions, or other activities. The point totals for each activity will vary depending upon the length of the activity.

Discussions

- The textbook contains “Thought Questions” which you each individually will write their initial answers for the questions. Student discussions will continue as students are asked to reflect on each other’s initial answer and write responses. Responses may include questions back to the initial answer. Point totals are based on qualitative and quantitative measures.

Unit Tests

- A test will be given at the conclusion of each unit.

AP Exam

- Students are required to do the “Create Performance Task” component of the AP Exam. This component has a series of course activities that will count towards the grade.
- Students are expected to register and take the AP Computer Science Principles exam in May 2021. This exam, however, is not a required part of the course and will not affect the course grade.

Grading Scale:

98-100 A+	87-89 B+	87-89 C+	67-69 D+	
93-97 A	83-86 B	73-76 C	63-66 D	0-59 F
90-92 A-	80-82 B-	70+72 C-	60-62 D-	

Grading Procedures:

Grades will be posted to the Moodle gradebook either automatically or shortly after the assignment is due. Feedback on assignments is provided through Moodle. If you have questions about something you see in the gradebook, please contact your instructor as soon as possible. All students are expected to keep track of their own progress using Moodle on a systematic basis.

Instructor Policies:

Attendance: Even if a student’s local school does not have school on a particular day (snow day, teacher’s conference, quarter break, choral fest, class trip, etc.) ALHS Online courses will continue to meet and students are expected to complete required work on time. See page 8 of the ALHSO Student/Parent Handbook.

Instructor-Proctor-Parent Communication: The instructor will strive to contact the ALHSO course proctor when he/she observes tendencies including, but not limited to, lack of academic effort, poor and failing grades, and online misconduct. Parents/guardians may be contacted via email in these

matters too. Proctors and parents are urged to communicate via email with the instructor when they have questions and concerns. The instructor will make every effort to respond to emails in a timely manner.

Late and Incomplete Work: Assignments that are not turned in by the due date will be marked as “missing” and will receive a grade of zero. Students may regain partial credit for late assignments once turned in. Students are strongly encouraged to complete their work in a timely manner throughout the semester. Grading of late work may be delayed.

Makeup Work: Students should complete makeup work as quickly as possible in order to be able to complete all of the coursework before the end of the course.

Extra Credit: There are no extra credit assignments in this course.

Academic Dishonesty: The instructor expects all students will honor the principles of honesty and truth as taught in God’s Word. This means that all academic work will be done by the student to whom it was assigned without unauthorized aid of any kind. Research sources must be cited fully and accurately. The instructor reserves the right to use academic screening methods to check the authenticity of student work.

As stated in the ALHSO Student Handbook, students will be held to the academic honesty policy in effect at their school which may include failing the course for violations of the policy.

Behavior: Behavior is the domain of your local WELS high school and your supervising teacher. In keeping with the distinct character of your Lutheran high school and the ALHSO, students will be expected to behave in the ways that our Lord asks Christians to act including showing love and respect to their fellow students and teacher.

Daily Routine: Students are expected to spend an entire period during each school day working on the assignments for this course.

Academic Progress: It is the intent of your local Lutheran high school and ALHSO that all students enrolled in this course should complete it successfully. The instructor will strive diligently to help students to succeed. The instructor will contact the parents or guardians to ask for their help in encouraging their students to do the best work possible. When it becomes apparent to the instructor that a student has placed himself/herself in jeopardy of meeting the minimum requirements of the course, the instructor may contact the online proctor/advisor assigned by your high school and your parents/guardians in order to help remedy the situation.

Course Help: Students are encouraged to ask for help right away whenever they have a problem or question. Students needing help outside of class should contact the instructor to arrange a time during a study hall, before school, or after school. In these cases, the instructor will use an online video conferencing tool like Zoom to conduct help meetings.