



## SAMPLE SYLLABUS #1

# AP<sup>®</sup> Computer Science A

## Curricular Requirements

---

<b>CR1</b>	Students and teachers have access to a college-level computer science textbook or resource in print or electronic format.	<i>See page:</i> 2
<b>CR2</b>	The course provides opportunities to develop student understanding of the required content outlined in each unit described in the AP Course and Exam Description (CED).	<i>See page:</i> 2
<b>CR3</b>	The course provides opportunities for students to develop the skills related to Computational Thinking Practice 1: Design Code, as outlined in the AP Course and Exam Description (CED).	<i>See page:</i> 3
<b>CR4</b>	The course provides opportunities for students to develop the skills related to Computational Thinking Practice 2: Develop Code, as outlined in the AP Course and Exam Description (CED).	<i>See pages:</i> 2, 3
<b>CR5</b>	The course provides opportunities for students to develop the skills related to Computational Thinking Practice 3: Analyze Code, as outlined in the AP Course and Exam Description (CED).	<i>See page:</i> 2
<b>CR6</b>	The course provides opportunities for students to develop the skills related to Computational Thinking Practice 4: Document code and computing systems, as outlined in the AP Course and Exam Description (CED).	<i>See page:</i> 3
<b>CR7</b>	The course provides opportunities for students to develop the skills related to Computational Thinking Practice 5: Use computers responsibly, as outlined in the AP Course and Exam Description (CED).	<i>See page:</i> 4
<b>CR8</b>	The course provides students with hands-on lab experience to practice programming through designing and implementing computer-based solutions to problems.	<i>See pages:</i> 2, 3, 4

# Sample Syllabus #1

## AP Computer Science A Syllabus

### Course Resources

(available to each individual student)

Textbook or resource provided on the AP Course Audit form. **CR1**

### Course Outline **CR2**

Module	Title (Course Framework Topics covered)	Sample Projects, Activities & Assignments
1	Algorithms, Using Classes & Objects, Variables, Input & Output (Unit 1.1–1.10, 1.12–1.14)	<ul style="list-style-type: none"> <li>TempConverter <b>Lab #1</b> <b>CR8</b>—Students create a program that <b>prompts the user for a temperature in Fahrenheit and displays the equivalent Celsius temperature.</b> (Skill 2.A) <b>CR4</b></li> </ul>
2	Conditionals, Math class & String class (Unit 2.1–2.6, 1.11, 1.15)	<ul style="list-style-type: none"> <li>Math Tutor <b>Lab #2</b> <b>CR8</b>—Students create a program that <b>generates a simple arithmetic problem</b> for the user to answer. The program uses two random integers in the range 1–10 and a random operation (+, -, *, /). The user is asked to answer as an integer, then the program gives feedback (correct or incorrect, along with the correct answer). When the arithmetic operation generated was division, the user is asked to answer a follow-up arithmetic question using the same two integers and modulus division. Again, the program gives feedback of correct or incorrect with the correct answer. (Skill 2.A) <b>CR4</b></li> </ul>
3	Loops (Unit 2.7–2.12)	<ul style="list-style-type: none"> <li>Nested Loop Investigation: Students are provided a paper packet with several methods and the intended output of each method. Students <b>hand-trace the code in each method to determine</b> whether or not the method produces the intended output (Skill 3.C). Students <b>make corrections</b> on paper to any methods that do not work as intended, <b>including an explanation</b> of why the original code did not work. (Skill 3.D) Students then receive a Java project containing the original code, make the changes digitally, compile and test. Finally, students make any additional necessary corrections digitally and add comments explaining any additional changes that were necessary. (Skill 3.D) <b>CR5</b></li> </ul>

#### **CR1**

The teacher must select or provide a college-level computer science textbook or resource.

#### **CR2**

The syllabus must include an outline of course content by unit title using any organizational approach to demonstrate the inclusion of required course content.

#### **CR8**

The syllabus must include titles and descriptions of at least two lab experiences. For each lab, use the label Lab #1 or Lab #2 to identify the experience.

#### **CR4**

The syllabus must include a brief description of an activity or assignment in which students develop code to demonstrate a skill from Computational Thinking Practice 2.

#### **CR5**

The syllabus must include a brief description of an activity or assignment in which students analyze code to demonstrate a skill from Computational Thinking Practice 3.

Module	Title (Course Framework Topics covered)	Sample Projects, Activities & Assignments
4	Methods & Designing Classes (all of Unit 3)	<ul style="list-style-type: none"> <li>Library <b>Lab #3</b> <b>CR8</b>—Students will use pair programming to <b>design Book and Borrower classes</b> that could be used in a library to track the books owned by the library and information about each borrower with a library card. <b>(Skill 1.A)</b> Students must include documentation comments on each method <b>describing the purpose</b> of the method, the <b>initial conditions required for each parameter in order for the method to work correctly</b>, and the value (if any) returned by the method. <b>(Skill 4.A &amp; 4.B)</b> <b>CR3</b> <b>CR6</b></li> </ul>
5	1D & 2D Arrays (Unit 4.3–4.5, 4.11–4.13)	<ul style="list-style-type: none"> <li>Students will <b>design several solutions</b> for 2024 AP Free Response Question 2 Scoreboard, the class design question. <b>(Skill 1.A, 2.A &amp; 2.C)</b> <b>CR3</b> <b>CR4</b> <ul style="list-style-type: none"> <li>A solution that tracks the active team using a <code>String</code></li> <li>A solution that uses a separate <code>Team</code> class and tracks the active team using a <code>boolean</code> <b>(Skill 2.B)</b></li> <li>A solution that uses a <code>String</code> array for the team names, an <code>int</code> array for the team scores and an <code>int</code> to track the active team. <b>(Skill 2.B)</b></li> </ul> </li> </ul>
6	File Reading & ArrayLists (Unit 4.1–4.2, 4.6–4.10)	<ul style="list-style-type: none"> <li>Students complete a <b>lab</b> in which they find a comma separated values (CSV) file and create a program to <b>answer question(s) they have by processing the data</b>. Students will include their question and the answer their program yielded in a comment inserted in their code. <b>(Skill 1.B)</b> <b>CR3</b> <b>CR8</b></li> </ul>
7	Searching, Sorting & Recursion (Unit 4.14–4.17)	<ul style="list-style-type: none"> <li>“Which search is better?” <b>Lab</b>—Students implement a selection sort method and an insertion sort method. Each method is implemented to also return a count of certain operations that occur during the sort. Students provide a written analysis of what initial conditions of the list make each sort more efficient. <b>(Skill 2.A, 2.B, 2.C)</b> <b>CR4</b> <b>CR8</b></li> </ul>

**CR8**

The syllabus must include an explicit statement that at least 20 hours of in-class instructional time is spent in computer-based lab experiences.

**CR3**

The syllabus must include a brief description of an activity or assignment in which students design code to demonstrate a skill from Computational Thinking Practice 1.

**CR6**

The syllabus must include a brief description of an activity or assignment in which students document code to demonstrate a skill from Computational Thinking Practice 4.

**CR4**

The syllabus must include a brief description of an activity or assignment in which students develop code to demonstrate a skill from Computational Thinking Practice 2.

## General Notes

**Lab Component:** Approximately 50% of class time is spent on individual programming, guaranteeing that students spend well **over 20 hours of in-class time on lab experiences.** **CR8**

- Once each quarter, students are required to share a current event article discussing a computing innovation (e.g., self-driving cars or smartphones) with the class. Each student annotates their article, **making note of the impact of the specific computing innovation on society, economy, or culture.** Class discussions involving the impacts are held at least once per quarter with randomly chosen students presenting their articles. **[Skill 5.A] CR7**

### **CR8**

The syllabus must include an explicit statement that at least 20 hours of in-class instructional time is spent in computer-based lab experiences.

### **CR7**

The syllabus must include a brief description of an activity or assignment in which students explain how computing impacts society, economy, or culture.