

COURE TITLE: AP Computer Science A

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## **Forsyth County Course Syllabus, 2016 - 2017**

### **AP Computer Science A**

### **South Forsyth High School 2016 - 2017**

#### **Course Description:**

AP Computer Science A (AP CS-A) is an introductory course in computer science. It is both a college preparation course for potential computer science majors and a foundation course for students planning to study in other technical fields such as mathematics, engineering, physics, and chemistry, just to name a few. Even some “non-technical” fields such as business and psychology require students to take an entry-level programming course. Students enrolled in this course are expected to take the Advanced Placement examination in AP CS-A in May. Students who elect not to sign up to take one of these exams will take an equivalent exam in class that will count towards the final grade.

Because the design and implementation of computer programs to solve problems are skills that are fundamental to the study of computer science, a large part of the AP CS-A course is built around the development of computer programs that correctly solve a given problem. But, computer science is more than just programming. While students should leave this class with a clear understanding of programming in general, and the Java language in particular, they should also leave with the ability to analyze problems, propose potential solutions, and determine which of those are suitable for programming. They should be able to adapt to any new programming language they encounter in college or work situations and should be able to tackle any problem solving obstacles they encounter.

AP CS-A emphasizes programming methodology, procedural abstraction, and in-depth study of algorithms, data structures, and data abstractions. Students will write their own small to medium-sized programs, as well as study and modify a large case study program. The basic hardware and software components of computer science systems will be studied, as well as the responsible use of these systems. The course includes preparation for the AP CS-A exam (taken in the first or second week of May).

## **Standards:**

A more detailed syllabus and the AP CS-A will be provided to each student in PDF format, including a detailed list of objectives and topics within each objective.

## **Course Objectives:**

- Understand the main principles of object-oriented software design and programming.
- Learn to code fluently in Java in a well-structured fashion and in good style; learn to pay attention to code clarity and documentation.
- Learn to use Java library packages and classes within the scope of the AP/A Java subset
- Understand the concept of an algorithm; implement algorithms in Java using conditional and iterative control structures and recursion.
- Learn common searching and sorting algorithms and their relative efficiency: Sequential Search and Binary Search; Selection Sort, Insertion Sort, and Mergesort.
- Understand arrays and the `ArrayList` class.
- Acquire skills in designing object-oriented software solutions to problems from various application areas, including choosing appropriate data structures and algorithms, based on trade-offs and efficiency.
- Perform the three labs provided by the College Board.
- Discuss computing in context: ethical and social issues related to the use of computers.
- Prepare for the A-level AP exam in computer science.

## **Major Textbooks:**

*Java Software Solutions (JSS)*, Lewis, Loftus, & Cocking, 2nd Edition, 2007, Pearson Education, Inc. (provided by the school); students must bring to class with them daily.

*Barron's AP Computer Science A*, Roselyn Teukolsky, 7<sup>th</sup> edition (It is highly suggested that students purchase their own copy at approximately \$30)

Previous versions 5th or 6th Edition, Barron's Educational Series, Inc. are acceptable but ignore all references to GridWorld.

*AP Computer Science Quick Reference Guide* (provided by the school and available on-line).

## **Supplies:**

- 1) Pencils and paper; not all work is done on the computer
- 2) USB jump drive; so files can be transported between home and school
- 3) Access to a computer and the Internet away from school; there WILL NOT be enough time to complete programming assignments with only class time. Check the local library or SFHS media center for computers and arrangements can be made to access the classroom computers before school, after school, or during Instructional Focus.

## Syllabus at a Glance:

Unit	General Topic	Weeks
1	Introduction to Computer Science	1 - 3
2	Java Basics	4 - 9
3	Decisions	10 - 11
4	Iterations & Writing Classes	12 - 14
5	Programming with Arrays	15 - 17
6	Adv. Programming Structures - Sorts/Searches	18 - 20
7	Adv. Programming Structures - Recursion	21 - 23
8	More on Classes, Inheritance, and Interfaces	24 - 25
9	College Board labs (spread throughout the year)	26 - 28
10	Review for AP Exam	29 - 32
11	AP Exam, Final Projects	33 - 36

### Lab Component:

**Over 50 hours of hands on lab time is logged during the year for this course.** This course is taught in a classroom with computers and will include lab and lecture. It is expected that the lab time will also provide instructional value as students work together, ask questions, test each other's programs, and request assistance from the instructor. **Using the computer during lab time for anything other than working on programming assignments is strictly prohibited.**

### Required Assignments:

#### Formative Assignments:

This class will have daily homework and reading. There will be a few quizzes for each unit. Homework will sometimes be collected for a grade. Students will frequently complete AP level free response questions and these will also sometimes be collected for a grade. The major component for the Formative portion of the grade is from quizzes and labs. Lab work that is not completed during class time, must be completed at home. Programming assignments will be turned in through an on-line tool. ALL assignments must be turned in by the assigned due dates. Selected programming assignments will be graded in detail.

### **Summative Assignments:**

The summative grade will come primarily from test scores. There will be 2-3 tests in the fall semester, plus a mid-term exam. There will be 2-3 tests in the spring semester, including at least one complete AP practice exam that will be scored for a grade. There will be at least one large programming project each semester that will be counted as a test grade. The “Final Exam” will be either a written final exam, similar in content and length to the various AP practice exams, or a large programming project. If a large programming project is assigned as the Final Exam, students will not be able to exempt the entire project, but consideration will be given in exchange for the earned exempt status.

### **Independent Work Requirement (Extremely Important!):**

While students will have the opportunity to work together and share ideas, both in and away from the classroom, every student is expected to turn in independent and original work. **Students will not receive credit for submitted assignments that are substantially identical to work from other sources.**

### **Guidelines for BYOT Use:**

SFHS teachers and students will work together to ensure the most productive learning environment in the classroom. Use of BYOT supports the use of technology devices as a tool in a student’s education.

- Devices are to be “powered down” as the classroom teacher directs.
- Disregard of a directive by the classroom teacher to power down will be addressed with a progressive approach beginning with a verbal warning.
- Continued disregard of a directive by the classroom teacher to power down may be considered insubordination and addressed as a code of conduct violation.
- During summative assessments, devices will be powered down and put out of sight until all students in the classroom have completed the assessment and all materials have been collected by the teacher.

### **Academic Integrity:**

Academic integrity is the pursuit of scholarly activity in an honest and responsible manner. In the classroom, academic integrity involves a range of issues, including – but not limited to – cheating, plagiarism, and facilitating acts of academic dishonesty by others. Violations of academic integrity as outlined in the Forsyth County Schools Code of Conduct will be addressed according to the guidelines listed there.

### **Nature of the Work in AP CS-A:**

AP CS-A is a college-level course. Students who pass the AP exam in May often earn college Computer Science credit; requirements vary by college. As such, students should not expect to have prepared reviews handed to them prior to quizzes and tests, and they should also not expect their tests to be essentially identical to their practice problems. Computer Science requires different types of critical thinking and problem solving skills than other high school courses. Students with poor attendance and/or study habits, and off task behavior, are generally not successful in this course.

**Help Sessions:**

Extra help is available each morning from 7:45 to 8:15 or by making prior arrangements.

**Makeup Work:**

All missed work and assessments are the responsibility of the student when they are absent from school. Students that are absent on the class before a regularly scheduled assessment will be responsible for completing the assignment on the regularly scheduled day and time. Students that are absent for more than two consecutive days will be given five (5) school days to make up the assessment and/or other assignments if it is an excused absence. This does not include major projects, research papers, etc. where the deadline has been posted in advance. The teacher has the discretion to grant a longer period of time to make up work if there are extenuating circumstances.

**Grading Calculations:**

Course Average = 50% (1<sup>st</sup> Semester) + 50% (2<sup>nd</sup> Semester)

Course Work = 75% Summative + 25% Formative

Midterm and Final assessments count as two summative assessments each.

**Grading Policy:**

A = 90 – 100

B = 80 – 89

C = 70 – 79

Failing = Below 70