

Advanced Placement® ** Computer Science A

COURSE DESCRIPTION:

Computer Science A emphasizes object-oriented programming methodology with a concentration on problem solving and algorithm development and is the equivalent of a first-semester college-level course in Computer Science. It also includes the study of data structures, design, and abstraction, but these topics are not covered to the extent that they are in Computer Science AB.

PREREQUISITES:

- Knowledge of mathematics at the Algebra II level and experience in problem solving. A student in either AP Computer Science course should be comfortable with functions and the concepts found in the uses of functional notation, such as $f(x) = x + 2$ and $f(x) = g(h(x))$.
- Some previous programming experience is also important and necessary for students to have before attempting this Computer Science Advance Placement A course. This course is equivalent to a first year university or college level course and the content is covered quickly. An introductory course in C++, Pascal, Visual Basic, Java or similar course would be sufficient. HTML is not considered a programming language and would not give the students enough of a background to be successful.
- A basic understanding of networks.
- Knowledge of the responsible use of computer systems, including system reliability, privacy, legal issues, intellectual property, and social and ethical ramifications of computer use.

COURSE LENGTH: Two semesters

REQUIRED TEXT: None

TECHNOLOGY REQUIREMENTS: Students should have access to a computer system that represents relatively recent technology (PIII). Each student in the course should have a minimum of 4 hours per week alone on a computer throughout the academic year. Schools need to have Java software already installed on their machines before the course starts and enough memory in their lab machines (128 MB) so that students will be able to compile and run Java program efficiently.

COURSE OUTLINE:

This course is designed to prepare students for the AP exam, and the course content prepares students to be able to:

- Design and implement computer-based solutions to problems in a variety of application areas
- Use and implement well-known algorithms and data structures
- Develop and select appropriate algorithms and data structures to solve problems
- Code fluently in an object-oriented paradigm using the programming language Java
- Be familiar with and be able to use standard Java library classes from the AP Java subset
- Read and understand a large program consisting of several classes and interacting objects
- Read and understand a description of the design and development process leading to such a program (an example of such a program is the AP Marine Biology Simulation Case Study)
- Identify the major hardware and software components of a computer system, their relationship to one another, and the roles of these components within the system
- Recognize the ethical and social implications of computer use

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