

Advanced Placement Computer Science A1

TECH 071 057

Credits: 0.5 units / 5 hours / NCAA

Course Description

AP Computer Science A 1 is the first semester of a 2 semester sequence that is equivalent to a one-semester, college-level course in computer science. The course emphasizes both object-oriented and imperative problem solving and design using Java language. These techniques represent proven approaches for developing solutions that can scale up from small, simple problems to large, complex problems. The course introduces students to computer science with fundamental topics that specifically include using JDK tools and running Java programs, using an IDE, object-oriented programming, Java syntax and style, objects and classes, logic and control statements, algorithms and iterations, strings and arrays, and the ethical and social implications of computer use and the Internet. All instructions in this course are written for a PC with Windows 7 operating system. You may need to make adjustments if you are using a different platform or operating system. Students will need to download both Java SDK and an IDE such as JCreator, along with various programming components and student guides from the online course or from the textbook publisher's website for use in course activities and projects.

Graded Assessments: 4 Unit Evaluations; 4 Projects; 4 Proctored Progress Tests

Course Objectives

When you have completed the materials in this course, you should be able to:

1. Understand and apply the main principles of object-oriented software design and programming: classes and objects, constructors, methods, instance and static variables, inheritance, class hierarchies, and polymorphism.
2. Learn to code fluently in Java in a well-structured fashion and in good style; learn to pay attention to code clarity and documentation.
3. Learn to use Java library packages and classes within the scope of the AP Java subset.
4. Understand the concept of an algorithm.
5. Learn to select appropriate algorithms and data structures to solve a given problem.
6. Compare efficiency of alternative solutions to a given problem.
7. Understand one- and two-dimensional arrays and use them appropriately in programming projects.
8. Acquire skills in designing object-oriented software solutions to problems from various application areas.
9. Discuss ethical and social issues related to the use of computers.
10. Prepare for the AP Computer Science A exam; meet all of the curricular requirements defined by College Board for this course.

Course Outline

Unit 1: The Beginning

Lesson 1: Introduction to Hardware, Software, and the Internet

Lesson 2: Introduction to Software Engineering

Project 1

Progress Test 1

Unit 2: Working with Java

Lesson 3: Java Syntax and Style

Lesson 4: Objects and Classes

Project 2

Progress Test 2

Unit 3: Arithmetic, Logic, and Control Statements

Lesson 5: Data Types, Variables, and Arithmetic

Lesson 6: Boolean Expressions and if-else Statements

Lesson 7: Algorithms and Iterations and Ethical and Social Implications of Computer Use

Project 3

Progress Test 3

Unit 4: Strings and Arrays

Lesson 8: Strings

Lesson 9: Arrays

Lesson 10: Two-Dimensional Arrays

Project 4

Progress Test 4

Required Textbook and Materials

(available through Follett virtual bookstore at <http://highschool.nebraska.bkstr.com>)

Textbooks:

Java Methods: Object-Oriented Programming and Data Structures, 3rd AP Edition, 2015. (ISBN 9780982477564)

Optional

This textbook is an important part of student's preparation for taking the College Board's AP Computer Science A exam. It is optional for the successful completion of this course, and is used mainly in the second semester of this course.

Be Prepared for the AP Computer Science Exam in Java, 6th Edition. 2014. (ISBN: 9780982477533)