

Syllabus: AP Computer Science A v9

Below is the syllabus for your course.

Estimated Completion Time: This AP Computer Science A course is scheduled for 2 semesters, completed within 32-36 weeks at the traditional pace

Description:

AP Computer Science A is a college-level computer course covering the applications of computing within the context of programming methodology, algorithms and data structures. This is a one-year course in which students work towards taking the College Board Computer Science A examination in May. The computer language that will be used is Java, which is a free download for either a Macintosh or a Windows platform.

Course Assessment and Participation Requirements:

Besides engaging students in challenging curriculum, the course guides students to reflect on their learning and to evaluate their progress through a variety of assessments. Assessments can be in the form of self-checks, practice lessons, multiple choice questions, writing computer programs, oral assessments, and discussions. Instructors evaluate progress and provide interventions through the variety of assessments built into a course, as well as through contact with the student in other venues.

Module 1

Topics Covered:

- Orientation
- Course Folder Management
- Installing Java
- Installing the BlueJ DVE
- BlueJ Tutorial
- Hello World
- Stylish Java
- Checkpoint Alpha

Module 2

Topics Covered:

- Order of Operations
- Printing Arithmetic Expressions
- Primitive Data Types: ints

- Primitive Data Types: doubles
- Arithmetic Expressions
- Primitive Data Type Conversions
- Pitfalls, Surprises and Shortcuts
- Challenge Program
- Checkpoint Beta

Module 3

Topics Covered:

- Pseudocode, Recipe for Success
- Primitive Data Type: char
- String Objects Lite
- Escape Sequences
- The Java API
- String Class Methods
- Scanner Class Methods
- Parsing
- Challenge Program
- Discussion Based Assessment
- Module 3 Exam
- Checkpoint Gamma

Module 4

Topics Covered:

- Getting Started with if Statements
- Number Systems
- Primitive Data Type: Booleans
- Condition Statements: if
- Condition Statements: if-else
- Condition Statements: if-else-if
- Comparing Strings
- Logical Operators
- Checkpoint Delta

Module 5

Topics Covered:

- Loops
- while Loops (part 1)
- while Loops (part 2)
- for Loops
- Nested Loops
- Writing Text Files
- Challenge Program
- Checkpoint Epsilon
- Discussion

Module 6

Topics Covered:

- Getting Started with Arrays
- One-Dimensional Arrays
- Formatting Output
- The for – each Loop
- Challenge Program
- Checkpoint Zeta: Challenge Exam 2

Module 7

Topics Covered:

- Getting Started with Methods
- Java's Math Class
- Defining New Static Methods: Part 1
- Defining New Static Methods: Part 2
- Defining New Static Methods: Part 3
- Discussion Based Assessment
- Challenge Program
- Checkpoint

Module 8

Topics Covered:

- Getting Started with Objects
- Real World Objects
- Instances of a Class
- Default Constructors

- Discussion Topic
- Constructors with Parameters
- Overloading Methods with Using Two Classes
- Constructing Multiple Objects
- Arrays of Objects
- Javadocs
- Array Lists I
- Array Lists II
- Challenge Program
- Checkpoint Theta
- Exam

Module 9

Topics Covered:

- Analog vs. Digital
- Computer Anatomy 1010
- Computer History: Back in the Day
- Four Generations of Modern Computers
- Challenge Program
- Checkpoint Iota

Module 10

Topics Covered:

- Semester Exam

Module 11

Topics Covered:

- Technology and Society
- Privacy Issues
- Security Issues
- Legal Issues
- GridWorld Case Study
- Check Point Kappa

Module 12

Topics Covered:

- Getting Started with Recursion
- Divide et Impera
- Real World Recursion
- The Recursive Leap of Faith
- There and Back Again
- Are We There Yet?
- Challenge Program
- Mystery Message
- Create Your Own Challenge Exam
- GridWorld Case Study
- Discussion-Based Assessment
- Check Point Lamda

Module 13

Topics Covered:

- Introduction to Inheritance and Polymorphism
- Extending Classes
- Class Hierarchies
- Polymorphism
- Overriding Methods
- Challenge Program
- GridWorld Case Study
- Checklist

Module 14

Topics Covered:

- Getting Back to Basics
- Design Study: Iterative and Incremental
- Static Means Never Having to Instantiate an Object
- Class Variables and Constants
- Revisiting Randomness
- this or That Variable
- Thinking Outside the Box
- Challenge Program
- Checkpoint
- Challenge Exam
- Discussion

- GridWorld Case Study

Module 15

Topics Covered:

- Introduction to Abstractions
- Abstract Classes
- Built-In Interfaces
- Comparable &Tgt; Interface
- Challenge Program
- Challenge Exam
- GridWorld Case Study
- Checklist

Module 16

Topics Covered:

- Introduction Standard Algorithms
- Transversals Lesson
- Replacements Lesson
- Insertions Lesson
- Deletions Lesson
- Challenge Program
- GridWorld Case Study
- Checklist

Module 17

Topics Covered:

- Introduction to Sorting
- Bubble Sort
- Insertion Sort
- Selection Sort
- Merge Sort
- Challenge Program
- GridWorld Case Study
- Checklist

Module 18

Topics Covered:

- Searching
- Sequential Searching
- Binary Search
- Challenge Program
- Challenge Program
- GridWorld Case Study
- Checklist
- Discussion-Based Assessment

Module 19

Topics Covered:

- Introduction to Program Analysis
- Assertions and Exceptions
- Challenge Program
- GridWorld Case Study
- Checklist

Module 20

Topics Covered:

- Getting Started with Your Review
- Exam Format, Grading, Hints
- Java Features, Part 1
- Java Features, Part 2
- Program Design and OOP Concepts
- Algorithms
- GridWorld Case Study
- Solutions to Past Free Response Questions
- Practice Exams
- 2004 Released AP Computer Science A Exam
- Reflections
- Final Exam