



## Small Java 7-9 Syllabus

### Course Goals

#### 1 Introduction to Java Programming

Students learn basic principles of writing programs using the Java programming language. In the process, they also learn some of the techniques commonly used in object oriented programming.

#### 2 Graphics and User Interface

Students receive an introduction to programming with graphics using Java and learn some user interface elements to make their programs interactive.

### Course Topics

#### 1 Basics of Programming

Students learn the basic elements and syntax of the Java programming language.

#### 2 User Interface Elements

Students learn to expand their programs using dialog boxes and input prompts, allowing for dynamic user input instead of static values.

#### 4 Objects

Students learn how to use and create Objects in the Java language. Objects are the core of all Java programs and allow for combining multiple variables into one reference.

#### 5 Classes

Students learn how to create their own classes, allowing them to add new functionality to the existing objects provided by the Java programming language. Students write new methods for these classes, allowing them to solve a variety of challenges.

#### 6 Graphics

Students learn how to draw shapes and manipulate colors using Java's graphics libraries.

#### 7 If-Else Statements

Students learn to control the flow of their program using If-Else statements. These allow their programs to have branching paths and handle a wider variety of problems than linear programs.

#### 8 Loops

Students learn the applications of loops in their program to repeat certain tasks, either for a specific number of times or until a certain condition is broken.

### Course Schedule

## Day 1

### Module 1 - Introduction to the Java Environment

Students begin to learn the basics of programming and of the Java language specifically.

#### Introduction to Programming

Students learn the mechanics of programming in the Java language.

#### Introductory Exercises

Students practice the basics of Java through several exercises and a project.

#### Compilation

Students learn the purpose of a compiler in helping to perfect their programs.

## Day 2

### Module 2 - Java Basics

Students learn the basic elements of programming in the Java language.

#### Types, Variables, and Expressions

Students learn about the concept of types and how to create variation in their programs.

#### Review

Students briefly review the concepts they have learned over the past two days.

#### Input

Students learn various ways to input information using Java and receive output based on the input.

## Day 3

### Module 3 - Using Objects

Students learn how to create objects and utilize them in their programs.

#### Warm-Up

Students write a program that combines several of the concepts they have learned.

#### Additional Expressions

Students learn how to use Java to create a program that can solve math problems.

#### Objects

Students learn the purpose of objects in Java and how to construct them.

## Day 4

### Module 4 - Creating Classes and Using/Testing Classes

Students learn how to construct classes in Java and use them in programs.

#### Class Design

Students learn how to create a class in Java and what its uses are.

#### Constructors and Methods

Students fill in the class they have created to make it perform various actions.

## Day 5

### Module 5 - Classes with Graphics

Students learn how to incorporate graphics into their programs using classes.

#### Graphics

Students learn how to create frame windows and drawings within those windows.

## Day 6

### Module 6 - Programming Graphics

Students learn how to create shapes and colors using Java.

#### Drawing Rectangles

Students learn how to draw rectangles with an extension of the knowledge they gained the previous week.

#### Ellipses and Lines

Students learn how to draw additional shapes using Java and implement colors.

## Day 7

### Module 7 - Decisions: If Statement, Relational Operators

Students learn how to properly use if-else statements while programming with Java.

#### If-Else Statements

Students learn how to properly use if-else statements in their programs.

#### Comparisons

Students learn how to compare values to each other using Java.

## Day 8

### Module 8 - Iteration: For and While Loops

Students learn how to use for and while loops to cause a part of code to run repeatedly.

#### For Loops

Students learn how to use for loops to run multiple iterations of code.

#### While Loops

Students learn how to repeat code indefinitely using a while loop.

## Day 9

### Final Project

Students complete a final project using Java at the instructor's discretion.

## **Day 10**

### **Conclusion**

Students complete the final project they have been working on.

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