

## Java Fundamentals – Course Description

### Overview

This course engages students with little or no programming experience to create Java programs. Participants are introduced to object-oriented programming concepts, terminology, and syntax, and the steps required to create basic Java programs using the Alice, Greenfoot, and Eclipse interactive development environments. Hand-on practices figure prominently throughout this course so students can experience firsthand the power of computer programming.

### Available Curriculum Languages:

- Arabic, Simplified Chinese, English, French, Indonesian, Japanese, Brazilian Portuguese, Spanish

### Duration

- 90 hours (one semester)

### Target Audiences

#### Primary Audience

- College/university faculty who teach computer programming, information communications technology (ICT), or a related subject
- Secondary school teachers who teach computer programming

#### Secondary Audience

- None

### Prerequisites

#### Required

- Basic understanding of at least one programming language
- The ability to follow software installation instructions and install Alice, Greenfoot, and Eclipse on a computer

#### Suggested

- Getting Started with Java Using Alice and Creating Java Programs with Greenfoot or previous experience with at least one programming language

### Suggested Next Courses

- Java Programming

## Lesson-by-Lesson Topics

### Introduction

- Introduction

### Alice 3

- Getting Started with Alice 3
- Add and Position Objects
- Procedures and Arguments
- Rotation and Randomization
- Declare Procedures
- Control Statements
- Functions
- IF and WHILE Control Structures
- Expressions
- Variables
- Keyboard Controls
- Develop a Complete Animation
- Java Variables and Data Types
- Java Methods and Classes

### Greenfoot

- Getting Started With Greenfoot
- Methods, Variables and Parameters
- Source Code and Documentation
- Developing and Testing an Application
- Randomization and Constructors
- Defined Methods
- Sound and Keyboard Control
- World Animating and Game End
- Abstraction
- Loops, Variables, and Arrays

### Java Basics

- Getting Started with Eclipse
- Object and Driver Classes
- Data Types and Operators
- Strings

### Program Structure

- Using Scanner and Conditional Statements
- Using Program Control Statements

### Arrays and Exceptions

- Arrays
- Handling Errors

### Java Classes

- Classes, Objects, and Methods
- Parameters and Overloading Methods
- The Static Modifier and Nested Classes
- Inheritance
- Polymorphism