

# Course Outline



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## Fundamentals of Computer Programming

### Course Description:

This hands-on course provides a comprehensive introduction to programming, and builds a solid foundation of programming skills that can be used to master additional programming languages like C, C++, or Java. In this course you will write, compile, and debug programs in Java.

Audience: Web developers, system administrators, technical managers, and anyone wanting to develop programming skills.

### Pre-requisites:

No programming experience is required.

### Course Content:

- **BASIC CONCEPTS AND DEFINITIONS**
  - What is a Program?
  - "Hello, world"
  - The Programming Process
  - Program Files and Program Execution
  - System Programs vs. Application Programs
  - Input - Process - Output
  - Programming Languages
  - Compiler Errors vs. Runtime Errors
  - Development Environments

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- **WRITING SIMPLE PROGRAMS**
  - Reading Input
  - Performing Numeric Calculations
  - Formatting Output
  - Decision Making
  - Iteration
  - Commenting Your Source Code
  - Good Programming Style
  
- **DATA TYPES, CONSTANTS, AND VARIABLES**
  - A Program's Purpose is to Process Data
  - Computer Memory
  - Data Can Be of Different Types
  - Named Data: Variables
  - Literal Data
  - Assignment
  - Printing Variables
  
- **SCREEN OUTPUT AND KEYBOARD INPUT**
  - Writing to the Screen
  - Characters That Have Special Meaning
  - Some Simple Formatting
  - Reading from the Keyboard
  - Prompting and Validating
  
- **EXPRESSIONS**
  - Expressions: Where the Work Gets Done
  - Expression Evaluation: The Result
  - Arithmetic Expressions
  - Relational Expressions
  - Where are Relational Expressions Used?
  - And? . . . Or?
  - Precedence and Associativity
  
- **DECISION MAKING**
  - Sequential Execution
  - What is Decision Making?
  - Simple Decisions: if

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- **DECISION MAKING**
  - Two-Way Decisions: else
  - Code Blocks
  - Nesting Control Statements
  - Multi-Way Decisions: switch
  
- **LOOPING**
  - Kinds of Loops
  - Iterative Loops
  - Code Blocks and Loops
  - Nested Loops
  - Conditional Loops
  - Infinite Loops
  
- **SUBROUTINES**
  - Programming Without Subroutines
  - Reusable Code in a Subroutine
  - The Starting Point
  - Variable Visibility: Scope
  - Parameters
  - Returning a Value
  - Method Stubs
  - Libraries
  
- **DEBUGGING**
  - What is Debugging?
  - Commenting Out Code
  - Simple Debugging with Print Statements
  - Making Debugging Print Statements Conditional
  - Programs that Help You Debug Programs
  
- **DATA COLLECTIONS - ARRAYS**
  - Scalar Data vs. Data Collections
  - What is an Array?
  - Accessing Array Elements
  - Multidimensional Arrays
  - Array Initialization

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- **DATA COLLECTIONS - CLASSES**
  - What is a Class?
  - Object vs. Class
  - Accessing Object Members
  - Using Arrays with Classes
- **WORKING WITH FILES**
  - Terminal I/O and File I/O
  - Opening Files
  - Opening a File for Writing
  - Opening a File for Reading
  - Checking for File Open Errors
  - Closing a File
  - Text Files vs. Binary Files

**Course Duration:**

**5 Days**

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