

# Software Development I Course Information

Software Development Fundamentals I & II introduces learners to the core components of writing programs. From a basic introduction to using the software development interface to the fundamentals of data structures, data types and variables. The course introduces the core concepts of object-oriented programming and provides an important primer for any future career in the field.

## Learning Outcomes for Software Development Fundamentals I

1. Sound knowledge of program flow control, data types and variables.
2. Fundamental knowledge of methods, functions, and argument parsing.
3. Apply functional decomposition to break a program into smaller pieces.
4. Fundamental knowledge of data structures.
5. Write applications to traverse data structures using a programming language.
6. Applying object-oriented principles to code in a programming language.
7. Writing automated unit tests and understand the rules of test-driven development.
8. Using version control to manage source code when developing applications.

## Admission Requirements for Software Development I

Minimum admission requirement is a National Senior Certificate (NSC) or Senior Certificate (SC) or a National Certificate Vocational (NCV)

## Course Content for Software Development I

1. Introduction to A Development Platform
  - Introducing the Programming Language
  - Setting up the Development Environment
  - Understanding the IDE
  - Language Essentials
  - Keywords
  - Primer on Data Types
2. Built in Types & Logical Operators
  - Basic types
    - Data types
      - ❖ Data Types
      - ❖ String Handling
    - Classes
    - Fields
    - Properties
    - Constructors and Finalizes
      - ❖ Constructors
      - ❖ Static Constructors
      - ❖ Destructors
  - Arrays
    - Declaring and Populating an Array
    - Using Collection Initializers
    - Retrieving an Element from an Array
    - Iterating Through an Array
    - Using Array Methods
  - Expressions and Operators
  - Conditional Operators

- Operator Result Types
  - Relational Operators
  - Arithmetic Operators
  - Type Conversions
3. Simple Flow Control
- Expression Statements
  - Selection Statements
  - Iteration Statements
4. Methods & Functions
- What is a method/function?
  - Creating a method and a function
  - Return Type and Parameters
    - Improving Parameters in the Method Signature
    - Named Arguments
    - Defining Enumerated Parameters
    - Optional Parameters
    - ref and out Parameters
  - Overloading and Extension Methods
5. Primer on Types and Objects
- Implicit vs. Explicit Conversions
  - Creating objects with a new operator
    - Different way to initialise objects
  - Invocation Expression
  - Member Access Types
  - Classes and Constructors
6. Basics of Exception and Resource Management
- Exception Handling
7. Advance Types
- Types Revisited
  - Classes vs. Structs
  - Type Members
8. Unit Testing
- Unit tests steps
  - Setup of unit test
  - Asserts
  - Rules of Test-Driven Development
  - Pair Programming
9. Version Control
- Adding version control to a project
  - Committing Code
  - Push/Pull Requests
  - Cloning A Project
  - Using online repositories
  - Handle conflicts with version control.
  - Branching
10. Building an application using technologies covered in this module