

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
KATHMANDU UNIVERSITY

Subject: Introduction to Programming

Course Code: AIPC 101

Credit: 3

F.M: 100

Type: Core [Theory + Practical (Lab)]

Course Description

This course introduces fundamental concepts of programming. We emphasize solving problems using the C programming language. The course begins with the introductory programming concepts followed by fundamental concepts in C programming. Standard programming techniques like control structures (branching and iteration), arrays, functions, recursion, pointers, structures, unions and file handling will be introduced.

Objectives

1. To introduce fundamental concepts and data structures for writing programs
2. To familiarize students with some standard programming techniques
3. To develop basic programming skills regarding program design and development

Prerequisites

Prior programming knowledge is not required. However, students should have fundamental knowledge about computers.

Contents

1. Introductory Concepts [2 Hours]
 - 1.1. Introduction to programming
 - 1.2. Algorithms, pseudocode and flowcharts
 - 1.3. Types of programming languages - Assembly language, machine language, high-level programming language
 - 1.4. High-level programming languages - Compiling and interpreting
 - 1.5. Common programming paradigms - Imperative programming, and declarative programming
 - 1.6. The C programming language
 - 1.6.1. History of C
 - 1.6.2. C compilers
 - 1.6.3. Structure of a C program
2. C Fundamentals [4 Hours]
 - 2.1. The C character set
 - 2.2. Identifier and keywords
 - 2.3. Data types, variables, declaration
 - 2.4. Constants (String, Numeric, Character constants)

- 2.5. Symbolic constants
- 2.6. Expressions
- 2.7. Statements
- 3. C Operators [4 Hours]
 - 3.1. Arithmetic operators
 - 3.2. Logical and comparison operators
 - 3.3. Assignment operators
 - 3.4. Bitwise operators
 - 3.5. Unary operators
 - 3.6. Conditional operator
 - 3.7. Operator precedence and associativity
- 4. Preparing and Running a C Program [2 Hours]
 - 4.1. Planning a C program
 - 4.2. Writing a C program
 - 4.3. Interactive programming
 - 4.3.1. Getting input from users
 - 4.3.2. Writing output data
 - 4.4. Debugging techniques
 - 4.5. Library functions
 - 4.6. Multi-file programs
 - 4.7. General coding standards
- 5. Control Structures [6 Hours]
 - 5.1. Branching
 - 5.1.1. The if statement
 - 5.1.2. The if-else statement
 - 5.2. Iteration / Looping
 - 5.2.1. The for statement
 - 5.2.2. The while statement
 - 5.2.3. The do-while statement
 - 5.3. Nested control structures
 - 5.4. The switch statement
 - 5.5. The break statement
 - 5.6. The continue statement
 - 5.7. The go-to statement
- 6. Functions [5 Hours]
 - 6.1. Defining a function
 - 6.2. Accessing a function
 - 6.3. Function prototypes
 - 6.4. Passing arguments to a function
 - 6.5. Recursive functions
- 7. Storage Classes [2 Hours]
 - 7.1. Automatic storage class
 - 7.2. External storage class
 - 7.3. Static storage class

- 7.4. Register storage class
- 8. Arrays [5 Hours]
 - 8.1. Defining an array
 - 8.2. Processing an array
 - 8.3. Passing arrays to function
 - 8.4. Multidimensional array
- 9. Strings [2 Hours]
 - 9.1. Defining a string
 - 9.2. NULL character
 - 9.3. Initialization of strings
 - 9.4. Reading and writing strings
 - 9.5. Library functions for strings
- 10. Pointer [5 Hours]
 - 10.1. Fundamentals
 - 10.2. Pointer declaration
 - 10.3. Passing pointers to a function
 - 10.4. Pointers and arrays
 - 10.5. Dynamic memory allocation
 - 10.6. Pointer arithmetic
 - 10.7. Operation on pointers
- 11. Structures and Unions [4 Hours]
 - 11.1. Defining a structure
 - 11.2. Processing a structure
 - 11.3. Structures and pointers
 - 11.4. Passing structures to functions
 - 11.5. Self-referential structures
 - 11.6. Array of structures
 - 11.7. Unions
- 12. File handling [2 Hours]
 - 12.1. Opening and closing a file
 - 12.2. Reading and writing a file
 - 12.3. Processing a file

Textbooks

1. Gottfried, Byron (2019). *Programming with C* (4th ed.). McGraw Hill Education.
2. Perry, G., & Miller D. (2014). *C Programming Absolute Beginner's Guide* (3rd ed.). Pearson Education.
3. Kanetkar, Yashavant P. (2019). *Let us C* (5th ed.).
4. Deitel P., & Deitel H. (2018). *C How To Program: With An Introduction To C++* (8th ed.). Pearson Education.