Code No.: MDS 506

Course Title: **Programming Concepts and Techniques** Full Marks: 75

Nature: Theory +Practical (Elective) Credit: 3

***Course Description*:**

This course covers concepts of program and programming language, different program design tools, and different concepts of programming using C programming language.

Learning Objectives:

After the completion of this course, the students should be able to

- Understand concepts of program and programming languages
- Know different program design tools
- Write programs using different concepts of C programming.

Course Contents:

Unit 1: Basic Concepts [4 Hrs.]

Program and Programming Languages; Program Design Tools: Algorithm, Flowchart, and Pseudocode; Coding, Compilation and Execution, History of C, Structure of C program, Debugging, Testing and Documentation.

Unit 2: Elements of C [4 Hrs.]

C Standards(ANSI C and C99), C Character Set, C Tokens, Escape sequence, Delimiters, Variables, Data types (Basic, Derived, and User Defined), Compiling and Executing a C program, Constants and Literals, Expressions, Writing Comments.

Unit 3: Input and Output [2 Hrs.]

Conversion specification, Reading a character, Writing a character, I/O operations, Formatted I/O.

Unit 4: Operators and Expression [4 Hrs.]

Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment Operator, Ternary operator, Bitwise operator, Increment or Decrement operator, Conditional operator, Special Operators(sizeof and comma), Evaluation of Expression, Operator Precedence and Associativity.

Unit 5: Control Statement [6Hrs.]

Conditional Statements, Decision Making and Branching, Decision Making and Looping, Exit function, Break and Continue.

Unit 6: Arrays [6 Hrs.]

Introduction to Array, Types of Array (Single Dimensional and Multidimensional), Declaration and Memory Representation of Array, Initialization of array, Character Array and Strings, Reading and Writing Strings, Null Character, String Library Functions.

Unit 7: Functions [6Hrs.]

Library Functions, User defined functions, Function prototype, Function call, and Function Definition, Nested and Recursive Function, Function Arguments and Return Types, Passing Arrays to Function, Passing Strings to Function, Passing Arguments to Functions, Scope visibility and lifetime of a variable, Local and Global Variable.

Unit 8: Structure and Union **[6Hrs.]**

Defining and Accessing Structures, Array of structure, Passing structure to function, Passing array of structure to function, Nested Structure, Union, Comparing Structures with Unions.

Unit 9: Pointers **[6 Hrs.]**

Introduction, The & and * operator, Declaration of pointer, Pointer Arithmetic, Pointers and Arrays, Pointers and Character Strings, Array of Pointers, Pointers as Function Arguments, Function Returning pointers, Pointers and Structures, Dynamic Memory Allocation.

Unit 10: File Handling in C **[4 Hrs.]**

Concept of File, Opening and closing of File, Input Output Operations in File, Random access in File, Error Handling in Files.

Laboratory Works:

The laboratory work includes writing computer programs that covers all the concepts of C programming language including data types, variables, operators, all control statements, arrays, functions, structures and unions, pointers, and file handling.

References:

1. Byron Gottfried. *Programming with C*, Fourth Edition, McGraw Hill.
2. Herbert Schildt(2000). C *The Complete Reference*, Fourth Edition, Osborne/McGraw-Hill Publication.
3. Paul Deitel, Harvey Deitel, C.(2016).*How to Program*, Eighth Edition, Pearson Publication.
4. Al Kelley, Ira Pohl(2000) .*A Book on C*, Fourth Edition, Pearson Education.
5. Brian W. Keringhan, Dennis M. Ritchiem (1988).*The C programming Language*, Second Edition, Prentice Hall India .
6. Ajay Mittal (2010).*Programming in C.A Practical Approach*, Pearson Publication.
7. Stephen G. Kochan (2001) .*Programming in C*, CBS publishers & distributors.
8. E. Balagurusamy(2008).*Programming in ANSI C*, Third Edition, Tata McGraw- Hill publishing, New Delhi.

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