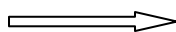# M.A/M.Sc Mathematics Semester 3rd

Effective from academic session 2011 ⟶ **Repetition for 2012 with minor change**

COMPUTER PROGRAMMING

Course No. MM-OP-308

Unit I

Introduction to Programming and Problem Solving – The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation.

Introduction to C Language – Character set, Variables and Identifiers, Built-in Data Types, Variable Definition, Arithmetic Operators and Expressions, Constants and Literals, Simple Assignment Statement, Basic Input/Output statements, Simple C Programs.

Conditional Statements and Loops – Decision making with a program, Conditions, Relational Operators, Logical Connectives, *if* statement, *if-else* statement, Loops: *while* loop, *do-while* loop, *for* loop, Nested Loops, Infinite Loops, switch Statement, Structured Programming.

Unit II

Arrays – One Dimensional Arrays: Array Manipulation; Searching, Insertion, Deletion of an element from an Array, Finding the largest/smallest element in an array, Two Dimensional Arrays: Addition/Multiplication of two matrices, Transpose of a square Matrix, Null Terminated Strings as Array of Characters, Representation of Sparse Matrices.

Pointers - Address operators, Pointer type declaration, Pointer assignment, Pointer Initialization, Pointer arithmetic, Function and pointers, Arrays and pointers, Pointer Arrays.

Unit III

Functions - Top Down approach of problem solving, Modular Programming and functions, Standard library of C functions, Prototype of a function, Formal parameter list, return type, Function call, Block Structure, Passing Arguments to a function: call by value; call by reference, Recursive functions, Arrays as function arguments.

Structures and Unions - Structure variables, Initialization, Structure Assignment, nested structure, Structures and functions, Structure and arrays: Arrays of structures, Structures containing arrays, Unions.

File Processing - Concept of files, File opening in various modes and closing of a file, Reading from a file and writing into a file.

Unit IV

Applications of C Language in Mathematics - Implementation of following methods using C programs: Bisection method ,Newton-Raphson Method, Gauss Elimination, Gauss Siedel Method, Iteration Method, Solution of 1st and 2nd Order Differential Equations Using Runga Kutta Method, Picard Method, Euler's Method and Predictor and Corrector method.

Writing C Programs for Binomial, Trinomial, and Multinomial Distributions.

Recommended Books:

1. Bryon Gottfried, "Programming with C"
2. E. Balaguruswamy, "Programming with ANSI C"
3. A. Kamthane, "Programming with ANSI & Turbo C"