COMPUTATIONAL MATHEMATICS

Course Code: **MM24108DCE**   Total Credits: **04**
Semester: **MA/M.Sc. 1ˢᵗ Semester**   Total Marks: **100**
Continuous Assessment: **Marks 20,** Theory: **Marks 80**   Time Duration: **2½ hrs**

Course Objectives: To develop logical skills and basic technical skills so that students should be able to solve basic computing problems. The students should be able to learn the basic of any computer programming language like C, software MATLAB and Scientific documentation using LaTeX.

Course Outcome: The students after the completion of this course shall be able to apply C programming and mathematical software's to solve various real life problems. Also, the students can handle complex problems and scientific documentation more efficiently.

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Unit I

Evolution of languages: Machine languages, Assembly languages, High-level languages. Software requirements for programming: System software's like operating system, compiler, linker, loader; Application programs like editor. Algorithm, specification of algorithm. Flowcharts.
Data Types, Identifiers, Variables Constants and Literals. Arithmetic relational logical operators. Basic input/output statements, Control structures: if-else statement, Nested if statement, Switch statement Loops: while loop, do while, for loop, Nested loops. Arrays: Declaration; initialization.

Unit II

Functions; prototype, passing parameters, identifier visibility. Variable scope, lifetime. Multi-file programming, Introduction to macros. Structures and unions: syntax. Pointers: variables, arrarys. Introduction to object oriented programming, Abstraction, Encapsulation, Introduction to classes and objects; Access specifiers, Constructor; destructor; Function overloading; Operator overloading.

Unit III

Basics of MATLAB, Overview of features and workspace, Data types, Arrays : Initialization and definition, Array, functions, 2-‐D Arrays, Multidimensional Arrays, Processing Array elements, Array sorting, Matrices: Matrix Operations & Functions, Special Matrices. Decision Making using If-‐Else and Switch, Function definitions, Function arguments, Function returns, Embedded Functions, Files and I/O, Reading from a file, Writing to a file, Formatting output, For Loops, Do While Loop, Plots and Graphs, Plot Types, Plot Formatting, Multiple Plots, Plot Fits.

Unit IV

Installation of Kile and MikeTeX, Simple typesetting, Spaces, Quotes, Dashes, Accents, Special symbols, Text positioning; Fonts: Type Style, Type Size, The Document: Document class, Font and Paper size, Page formats; Page style: Heading declarations, Page numbering, Formatting Lengths, Understanding Latex compilation Basic Syntax, Writing equations, Matrix, Tables, Page Layout – Titles, Abstract Chapters, Sections, References, Equation references, citation. List making environments Table of contents, Generating new commands, Figure handling numbering, List of figures, List of tables, Generating index, Packages: Geometry, Hyperref, amsmath, amssymb, algorithms, algorithmic graphic, color, tiles listing. Classes: article, book, report, beamer, slides.

Recommended Books

1.E. BALAGURUSWAMI "Programming in ANSI C" Tata McGraw Hill.
2.MATLAB Programming for Engineers by Stephen J. Chapman.
3.E. Krishnan. LATEX Tutorials A PRIMER.Indian TEX Users Group, Trivandrum, India, 2003
4. C Programming Absolute Beginner's Guide, Greg Perry ,3rd edition, Que Publishing.
5. BJARNE STROUSTRUP "The C++ programming language" Pearson Education.
6.Introduction to MATLAB for Engineers by William J. Palm III.
7. Solving Odes with MATLAB by Lawerence F. Shampine.