Course No: MCA-3T2
Course Title: Numerical and Statistical Computing

UNIT I
FORTRAN Programming: Introduction, Basic Elements, Input / Output. Assignment, Control Statements, Format Statements, Type Declaration Statement.Functions and Subroutine in FORTRAN, Common and Equivalent Statements, File Processing Statements.

UNIT II
Introduction.Requirements for computer-oriented solutions to numerical problems. Approximations & Errors – Types of Programming Errors, Computer & Arithmetic Errors, Accuracy and Precision, Round Off and Truncation Errors. Use of FORTRAN as a language for computer-based numerical problem-solving.
Algorithms to Compute Roots of Equation – Methods of Tabulation or Brute Force Method, Method of Bisection, The Secant Method, Newton-Raphson Method, Method for False Position. Programmatic Implementations of these methods.

UNIT III
Algorithms to Solve Linear Algebraic Equations : Gauss Elimination, Gauss Jordan, Gauss Seidel, L.U. Decomposition. Algorithms for Curve Fitting: Least Square Approximation, Lagrange Interpolated Polynomial, Newton Divided Differences Interpolating Polynomial. Programmatic Implementations.

UNIT IV
Algorithms to solve Ordinary Differential Equations – Euler Method and Modification.The trapezoidal Rule, Simpson's Rule.R-K Method.Programmatic Implementations.

REFERENCE BOOKS:

1. S.C.Chapra&R.P.Canale : "Numerical methods for Engineering". Tata McGraw Hill.
2. Krishenmurty and Sen : "Numerical Algorithms"
3. V. Rajaraman" Computer oriented numerical methods." Prentice Hall of India.
4. McCalla, Thomas Richard: "Introduction to Numerical Methods and FORTRAN Programming", John Wiley & Sons, Inc.
5. Grewal, B. S.: "Higher Engineering Mathematics", Hindustan Offset Problems Series.
6. "SCHAUM'S Solved Problems Series".
7. Sharma ,K. D.,:"Programming in Fortran".
8. Jain, M. K., Iyengav, S. R. K., Jain, R. K.: "Numerical Methods for Scientific and Engineering Computation"+, Wiley Eastern Ltd, New Delhi.