

W.e.f. 2000-2001 AB

Textbooks : 1. Graph Theory applications by L.R. Foulds, Narosa publishing House, New Delhi; 2. Applied Abstract Algebra by Rudolf Lidl and Gunter Pilz, published by Springer Verlag.

II SEMESTER SX-S 201

M201 - COMPUTER PROGRAMMING AND NUMERICAL ANALYSIS (without practical)

UNIT I : Fortran Programming : Fortran programming preliminaries, reading simple fortran programs, Constants and Variables, Arithmetic expressions, Input-Output statements, Simple computer programs, Control statements, The Do statement, Format Specification, Functions and Subroutines, Fortran Program Examples (Chapters III - XII of (1)).

UNIT - II : Interpolation and Approximation : Lagrange and Newton Interpolations, Finite difference operators, Interpolating polynomials using finite differences, Hermite interpolations, piecewise and spline interpolations. (Sections 4.1 - 4.6 of (2)).

UNIT III : Numerical Differentiation and Integration : Numerical differentiation, Optimum choice of step length, Extrapolation methods, partial differentiation, Numerical Integration, Methods based on interpolation, Methods based on Undermined Coefficients, Composite Integration Methods, Romberg Integration. (Sections 5.1 - 5.10 of (2)).

UNIT IV : Approximation of solutions of Ordinary differential equations Numerical methods, Single step methods, multi step methods, predictor - corrector methods. (Sections 6.1 - 6.5 of (2)).

Textbooks : (1) Principles of Computer Programming : Fortran 77 for IBM Pc by V. Rajaraman, Third Edition, Printice Hall of India, Delhi, 1992; (2) Numerical methods for Scientific and Engineering computation by M.K. Jain S.R.K. Iyengar and R.K. Jain, Third Edition, New Age International (P) Limited, New Delhi (1997).

M202 - DIFFERENTIAL EQUATIONS SX-S 202

UNIT I : Second order linear equations, wronkian and uses (ch. 3 sections 14-19) systems of first order equations (Chapter 7, section 36-38).

UNIT II : Types of Critical points, stability (Section 41) Critical points and stability for Linear systems (section 42).

Qualitative Theory : Oscillation theory and Boundary value problems, Eigen value problems, (Chapter 4, Sections 22 to 24 and Appendix A).

UNIT III : The Calculus of variations (Chapter 9, Sections 47—49, and appendix B).

UNIT IV : Models based on Differential equations : Vibrations in Mechanical systems (section 20), Newton's law of gravitation and the motion of the planets (section 21) Non-linear systems, volterra's Prey - Predator equations (section 39), Types of Critical points, stability.