MCA-14-15   COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS

Maximum marks: 100 (External: 80, Internal: 20)   **Time: 3 hours**

Note: Examiner will be required to set NINE questions in all.   Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT - I

Iterative Methods: Bisection, False position, Newton-Raphson methods, Discussion of convergences.
Solution of Simultaneous Linear Equations and ordinary Differential Equations: Gauss elimination method, Ill-conditioned equations, Gauss-Seidal iterative method.
Interpolation: Polynomial interpolation, Difference tables, Inverse interpolation.

UNIT - II

Ordinary Differential Equations: Euler method, Euler's Modified Method, Taylor-Series Method, Runge-Kutta method, Predictor-Corrector methods.
Numerical Differentiation and Integration: Differentiation formulae based on polynomial fit, Pitfalls in differentiation, Trapezoidal, Simpson's rules.
Curve Fitting: Polynomial fitting and other curve fitting.

UNIT - III

Approximation of functions: Approximation of functions by Taylor series and Chebyshev polynomials.
Statistics: Frequency distributions, Measures of central tendency, dispersion, moments, skewness and kurtosis. Binomial, Poisson and Normal distributions.
Correlation and Regression.

UNIT – IV

Statistical methods: Sample distributions, Test of Significance: Chi-Square Test, T and F test.
Analysis of Variance: One-way classification, ANOVA Table, Two-way classification (with one observation per cell).
Time Series Analysis: Components and Analysis of Time Series, Measurement of Trend, Seasonal fluctuations and cyclic movement.

Text Books:
1.   Rajaraman V., "Computer Oriented Numerical Methods", PHI.
2.   Gupta S.P. and Kapoor V.K., "Fundamentals of Mathematical statistics", Sultan Chand & Sons.

Reference Books:
1.   Gupta S.P. and Kapoor V.K., "Fundamentals of Applied Statistics", Sultan Chand & Sons.
2.   Graybill, "Introduction to Statistics", Tata McGraw Hill.
3.   Anderson, "Statistical Modelling", Tata McGraw Hill.