

MA 202 T Numerical and Statistical Methods

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs./Week	Theory		Internal Assessment	Term Work	Practical /Viva	Total Marks
					ES (3.0Hrs)	MS (2.0Hrs)				
3	1	---	7	4	60	30	10	---	---	100

UNIT 1

10

Numerical Solution of System of linear equations & non-linear equations: Solution of transcendental and non-linear equations by Bisection, Regular Falsi, Newton's Raphson and Secant method. Solution of a system of linear simultaneous equations by LU Decomposition, Cholesky Decomposition, Jacobi and Gauss Seidel methods. Concept of Ill conditioned system.

UNIT 2

14

Interpolation and Numerical Integration: Introduction of Finite differences, Operators, Newton Gregory Forward Interpolation Formula, Newton Gregory Backward Interpolation Formula, Gauss's Forward and Backward Interpolation Formula, Stirling's Central Difference Formula, Lagrange's Interpolation Formula for unevenly spaced data, Inverse Interpolation, Divided Differences, Properties of Divided Differences, Newton's Divided Difference Formula, Relation between Divided Differences and Ordinary Differences.

Formulae for Derivatives, Newton-Cotes's Quadrature Formula, Trapezoidal rule, Simpson's one-third rule, Simpson's Three-Eighth rule, Weddle's rule, Romberg's method, Double Integration.

Numerical solution of first order ordinary differential equation by Taylor series method, Picard's method, Euler's method, Modified Euler's method and Runge-Kutta (4th order only) method. Multi step methods: Adams - Moulton method and Milne's method.

UNIT 3

6

Probability: Various approaches of probability-classical, frequency (statistical), subjective and axiomatic. Theorems on probability, conditional probability, Independence, Baye's Theorem.

Random variable-discrete and continuous. Distribution function and their properties, probability mass and density functions.

UNIT 4

8

Statistics: Mathematical Expectation, Moment Generating Function and its properties. Probability distributions: Bernoulli, Binomial, Negative Binomial, Poisson and Normal Distributions. Theory of least squares and curve fitting. Correlation - Simple, Multiple and Partial, Regression lines and Regression coefficients.

APPROXIMATE TOTAL 38 Hours

Texts and References

1. B.S. Grewal, Numerical Methods in Engineering and Science with Programs in C & C++, Khanna Publishers (2010).
2. S.S. Sastry, Introductory Methods for Numerical Analysis, 4th Ed., Prentice Hall of India (2009).
3. M.K. Jain, S.R.K. Iyenger and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, 5th Ed., New Age International (2007).
4. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand Publisher (2007).
5. R.K. Jain & S.R.K. Iyenger, Advanced Engineering Mathematics, 3rd Ed., Narosa (2002).