

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: V

INFORMATION TECHNOLOGY

Subject Name: **Computer Oriented Statistical Methods**

Subject Code: **151601**

| Teaching Scheme | | | | Evaluation Scheme | | |
|-----------------|----------|-----------|-------|------------------------------------|---------------------------------|------------------|
| Theory | Tutorial | Practical | Total | University Exam (Theory) (E) | Mid Sem Exam (Theory) (M) | Practical (I) |
| 4 | 0 | 2 | 6 | 70 | 30 | 50 |

| Sr. No. | Course content |
|---------|---|
| 1. | Computer Arithmetic: Floating point representation of numbers, Arithmetic operations with normalized floating point numbers and their consequences, Error in number representation - Pitfalls in computing, Error propagation in evaluation. |
| 2. | Iterative Methods: Bisection, False position, Scant, Newton - Raphson methods. Successive approximation method, Newton raphson method for two variables, Discussion of convergence, Solving polynomial equations, Budan's theorem, Barirstow's method, Graeffe's root squaring method. |
| 3. | Interpolation and Approximation: Polynomial interpolation, Truncation error in interpolation, Difference tables and calculus of differences, Cubic splines, Inverse interpolation, Linear regression and nonlinear regression using least square approximation, Approximation of function by Taylor Series and Chebyshev Polynomials. |
| 4. | Numerical Differentiation And Integration: Differentiation dormulas based on polynomial fit, Pit-Falls in differentiation trapezoidal, Simpson's and gossip quadrature formulas. |
| 5. | Solution Of Simultaneous Linear Equation And Ordinary Differential Equations: Refinement of solution in Gauss elimination method pivoting, Ill Conditional equations, Gauss - Seidal and Gauss Jacobi Interactive methods, Taylor Series And Euler Methods, Error analysis, Runge-Kutta Methods, Predictor-Corrector methods, Automatic error monitoring and change of step size stability of solution. |
| 6. | Statistical Methods: Frequency distributions, Data analysis, Expectations and moments, Co-relation and regression, Trend analysis, Seasonal effects, Cyclical fluctuation, Moving average, MSE, Predictions. |

Reference Books:

1. Computer Oriented Numerical Methods, R. S. Salaria., Khanna Publisher.
2. Computer Oriented Numerical Methods - V Rajaraman., PHI.
3. Introduction to Numerical Analysis - By S. S. Sastry., PHI .
4. Numerical Methods for Scientific & Engineering Computation, M. K. Jain, S.R.K. Lyenger , R. K. Jain, Wiley Eastern Ltd.
5. Numerical Methods in Science & Engineering Prog.- By Dr. B. S. Grawal, Khanna Pub., New Delhi.
6. Miller & Freund's Probability and Statistics for Engineers – By Richard A Johnson., PHI.
7. Fundamentals of Mathematical Statistics – By S. C. Gupta & V. K. Kapoor , - Pub: Sultan Chand & Sons
8. Computer Oriented Numerical Methods D s vyassh & wandra Akshat