

# GUJARAT TECHNOLOGICAL UNIVERSITY

## B.E Semester: 3 Chemical Engineering

Subject Code 130503

Subject Name Computer Oriented Numerical Techniques

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Sr.No	Course contents
1	Iterative Methods Bisection, False Position, Secant, Newton-Raphson Method Iterative Method (Including Extended), Newton-Raphson Method For Non Linear Equations In Two Variables, Convergence Of Iterative Methods, algorithms & Computer programming for all these Methods, Polynomial Equations, Descartes Rule Of Sign.
2	Finite Differences And Interpolation Finite Differences: Forward, Backward And Divided Differences. Differences Table, Newton's Forward, Backward And Divided Differences Interpolation Formula. Lagrange Interpolation Formula, Inverse Interpolation, Error Propagation In Difference Table, Estimate Of Errors In Interpolation, Computer programming of the same
3	Curve Fitting And Method Of Least Squares Method Of Least Squares, Fitting A Straight Line And Polynomial Fitting A Non- Linear, Function: Fitting A Geometric And Exponential Curve, Fitting A Hyperbola At Fitting A. Trigonometric Function. Approximation Of Function By Taylor Series And Chebyshev Polynomials, Computer programming of curve fitting methods
4	Numerical Differentiation And Integration. Differentiation Formula Based On Functions Tabulator At Equal And Unequal Intervals Newton-Cotes Integration Formulae: Trapezoidal Rule, Simpson's 1/3 And 3/8 <sup>th</sup> Rule, algorithms & Computer programming for all these Methods,
5	Solution of Simultaneous Linear Equation: Solution Of Systems Of Linear Equations : Gauss Elimination Maths Pivots, Ill Conditions Equations, Gauss- Seidal And Gauss Jacobi Iterative Methods, computer programming of the same.
6	Numerical Solution Of Ordinary Differential Equation Taylor Series And Euler's Methods, Rangekutta Method Of 4 <sup>th</sup> Order, Milnes's Predictor – Corrector Methods,. Algorithms & Computer programming for all these Methods

### Reference Books:

1. Computer Oriented Numerical Methods - By V Rajaraman , Prentice – Hall of India , Delhi
2. Introduction to Numerical Analysis - By S. S. Sastry – PHI , Delhi
3. Numerical Methods for Scientific & Engineering Computation -By M. K . Jain , S.R.K. Lyenger , R. K. Jain Wiley Eastern Ltd.
4. A test book on Computational Methods - By Br. G. T. Kochav – Nirali Prakashan , Pune