

2016-17

Kakatiya University
B.Sc. Mathematics, VI Semester
NUMERICAL ANALYSIS

DSC-1F
BS:603

Theory: 3 credits and Practicals: 1 credits
Theory: 3 hours/week and Practicals: 2 hours/week

Objective: Students will be made to understand some methods of numerical analysis.

Outcome: Students realize the importance of the subject in solving some problems of algebra and calculus.

UNIT-I

Solutions of Equations in One Variable : The Bisection Method - Fixed-Point Iteration - Newtons Method and Its Extensions - Error Analysis for Iterative Methods - Accelerating Convergence - Zeros of Polynomials and Mullers Method - Survey of Methods and Software.

UNIT-II

* Interpolation and Polynomial Approximation: Interpolation and the Lagrange Polynomial - Data Approximation and Nevilles Method - Divided Differences.

UNIT-III

Hermite Interpolation - Cubic Spline Interpolation. Numerical Differentiation and Integration: Numerical Differentiation - Richardsons Extrapolation

UNIT-IV

Elements of Numerical Integration- Composite Numerical Integration - Romberg Integration - Adaptive Quadrature Methods - Gaussian Quadrature.

TEXT: Richard L. Burden and J. Douglas Faires, *Numerical Analysis (9e)*

References

- M. K. Jain, S. R. K. Iyengar and R. K. Jain, *Numerical Methods for Scientific and Engineering computation*
- B. Bradie, *A Friendly introduction to Numerical Analysis*

Field Visit
Trip syllabus

R. S. J.
Dept of Mathematics

DSC-1A
BS:104

DIFFERENTIAL CALCULUS

2019-2020 ~~20~~

Theory: 4 credits and Practicals: 1 credit
Theory: 4 hours/week and Practicals: 2 hours/week

Objective: the course is aimed at exposing the students to some basic notions in differential calculus.

Outcome: by the time students complete the course they realize wide ranging applications of the subject.

Unit – I

Successive differentiation:

Higher order derivatives, Calculation of the n th derivative, Some standard results, Determination of n th derivative of rational functions, The n th derivatives of the products of the powers of sines and cosines, Leibnitz's theorem, The n th derivative of the product of two functions.

Expansion of Functions:

Maclaurin's theorem, Taylor's theorem.

Mean Value Theorems:

Rolle's theorem, Lagrange's mean value theorem, Meaning of the sign of derivative, Graphs of hyperbolic functions, Cauchy's mean value theorem, Higher derivatives, Formal expansions of functions.

Unit – II

Indeterminate Forms:

Indeterminate forms, The indeterminate form $0/0$, The indeterminate form ∞/∞ , The indeterminate form $0 \cdot \infty$, The indeterminate form $\infty - \infty$, The indeterminate forms 0^0 , 1^∞ , ∞^0 .

* Curvature and Evolutes:

Introduction, Definition of curvature, Length of arc as a function, Derivative of arc, Radius of curvature-cartesian equations, Newtonian method, Centre of curvature, Chord of curvature, Evolutes and involutes, Properties of the evolute.

Unit – III

Partial Differentiation – Homogeneous Functions – Total Derivative:

Introduction, Functions of two variables, Neighbourhood of a point (a, b) , Continuity of a Function of two variables, continuity at a point, Limit of a function of two variables, Partial derivatives, Geometrical representation of a function of two variables, Homogeneous functions, Theorem on total differentials; composite functions; differentiation of composite functions; implicit functions.

Unit – IV

* Maxima and Minima:

Maxima and minima of function of two variables, Lagrange's method of undetermined multipliers.

Filed ^{visit} ~~trip~~ syllabus

R. S. D.
Dept of mathematics