Field Trip Syllabus. Field Trip

2016-17

DSC-1A
BS:104

DIFFERENTIAL CALCULUS

[2016-17]

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 calcu

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

Unit – I

Successive differentiation:
Higher order derivatives, Calculation of the nth derivative, Some standard results, Determination nth derivative of rational functions, The nth derivatives of the products of the powers of sines cosines, Leibnitz's theorem, The nth 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 hyperbolic functions, Cauchy's mean value theorem, Higher derivatives, Formal expansions functions.

Unit – II

Indeterminate Forms:
Indeterminate forms, The indeterminate form 0/0, The indeterminate form ∞/∞, The indetermina form $0, \infty$, 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 curvature-cartesian equations, Newtonian method, Centre of curvature, Chord of curvature, Evolute 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.

SEMESTER-VI

Field Trip - Syllabus

(A) Numerical Analysis

(w.e.f. academic year 2019-20 batch onwards)

DSE-VI

[2020-21]

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours/week and Tutorials: 1 hours/week

Objective: Students will be made to understand some methods of numerical analy
Outcome: Students realize the importance of the subject in solving some problems of alge and calculus.

Unit- I

Errors in Numerical Calculations - Solutions of Equations in One Variable: The Bisect Method - The Iteration Method - The Method of False Position-Newton's Method - Mulle Method - solution of Systems of Nonlinear Equations.

Unit- II

Interpolation and Polynomial Approximation: Interpolation - Finite Differences - Differenc of Polynomials - Newton's formula for interpolation - Gauss's central differences formulae Stirling's and Bessel's formula - Lagrange's Interpolation Polynomial - Divided differences Newton's General Interpolation formula - Inverse Interpolation.

Unit- III

Curve Fitting: Least Square Curve Fitting: Fitting a Straight Line-Nonlinear Curve Fittin **Numerical Differentiation and Integration:** Numerical Differentiation - Numerical Integratio Trapezoidal Rule-Simpson's 1/3rd-Rule and Simpson's 3/8th-Rule - Boole's and Weddle's Rule Newton's Cotes Integration Formulae.

Unit- IV

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Picard's Method - Euler's Methods - Runge Kutta Methods.

Text:

S.S.Sastry,Introductory Methods of Numerical Analysis, PHI

References:

1] Richard L. Burden and J. Douglas Faires,Numerical Analysis (9e)

2] M K Jain, S R K Iyengar and R K Jain, Numerical Methods for Scientific and Engineering computation

3] B.Bradie , A Friendly introduction to Numerical Analysis