

06/03/23 Unit-I : Differential Calculus

1.1 Definition of function: Concept of limits (Introduction only) and Problems related to four standard limits only.

1.2 Differentiation of x^n , $\sin x$, $\cos x$, e^x by first principle.

1.3 Differentiation of sum, product and quotient of functions.

Unit - II : Differential Calculus and its applications

2.1 Differentiation of trigonometric functions, inverse trigonometric functions, Logarithmic differentiation, successive differentiation (up to 2nd order)

2.2 Application of differential calculus in.

(a) Rate measures.

(b) Maxima and minima

Unit - III : Integral Calculus

3.1 Integration as inverse operation of differentiation with simple examples.

3.2 Simple standard integral and related Problems, Integration

3.3

Evaluation
With given limitsEvaluation of $\int_0^{\pi/2} \sin^n x dx$, $\int_0^{\pi/2} \cos^n x dx$

$$\int_0^{\pi/2} \sin^m x \cos^n x dx$$

• using formulae without proof (m and n being positive integers only) using pre-existing mathematical models.

Unit - IV : Application of integration, Numerical integration and differential Eqs.

4.1 Application of integration: for evaluation of area under a curve and axes (Simple Problems)

4.2 Numerical integration by Trapezoidal Rule and Simpson's $1/3$ rd Rule using pre-existing mathematical models.

Differential Equations:

4.3 Definition, Order, degree Types of differential Eqs.

Linearity, formulation of ordinary differential eqns. (up to 1st order)
Solution of ODE (1st order)
by Variable separation method.

Unit VI - Statistics and Software

Statistics : 5.1 Measures of central Tendency : Mean, Median, Mode

5.2 Measures of Dispersion : Mean deviation, Standard deviation.

5.3 Scilab Software - Theoretical Introduction.

5.4 Basic difference between MATLAB and Scilab Software,

5.5 Calculation with MATLAB or Scilab

(a) Representation of matrix (2x2) order

(b) Addition, subtraction of matrices (2x2 order) in MATLAB or Scilab.