

Course Content:**Unit I****Differential Calculus:**

n^{th} order differentiation of standard functions. Leibnitz theorem (Statement only & illustrative examples), Taylor's series for single variable (Statement only & illustrative examples), Maclaurin's series for single variable (Statement only & illustrative examples). Indeterminate forms.

Polar curves-angle between the radius vector and tangent (Formula & illustrative examples), angle between two curves (Formula & illustrative examples). Definition of Curvature and radius of curvature. -Radius of curvature for Cartesian and polar curves (Formulas & illustrative examples)

12 hrs.**Unit II****Partial Differentiation:**

Definition of Partial derivative (illustrative examples), Euler's theorem (Statement only & illustrative examples), Total differentiation (illustrative examples), Differentiation of Composite functions (illustrative examples). Jacobians and its properties (No Proof) (illustrative examples). Maxima and minima for a function of two variables.

10hrs.**Unit III****Integral Calculus:**

Reduction formula for $\int_0^{\pi/2} \sin^n x dx$, $\int_0^{\pi/2} \cos^n x dx$ and $\int_0^{\pi/2} \sin^n x \cos^m x dx$, (Formula & illustrative examples). Definition of Beta and Gamma functions (illustrative examples). Relation between Beta and Gamma functions (No Proof) (illustrative examples). Evaluation of Double integral (direct and region given), Change of order of integration, Change of variables. Evaluation of Triple integral (direct examples).

12hrs**Unit IV****Differential Equations of higher order**

Solution of Second order Linear ordinary differential equation with constant coefficients. Method of variation of parameters. Legendre's homogeneous equations.

10 hrs.**Unit V****Vector Calculus:-**

Vector Differentiation: Scalar point function and vector point functions. Gradient, Directional Derivative; Curl and Divergence-physical interpretation.

Solenoidal and irrotational vectors. Illustrative problems.

Vector Integration: Line integrals, Surface integrals and Volume integrals.

Green's theorem, Gauss divergence theorem and Stoke's theorem (only statements). **8 hrs.**

Text Books

- 1. B.S. Grewal:** Higher Engineering Mathematics, Khanna Publishers, 44th edition, 2017.
- 2. Rajesh Verma & H.K. Dass,** Higher Engineering Mathematics,,3rd edition. 2014.

Note: 1. Grades (i) PP (ii) NP

2. No semester End Examination

3. No credits (Bridge course)

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