

Class: B.Sc.	Year: First	Semester: Second
Faculty: Naveen Mehra	Subject: Mathematics	Teaching Period(Duration): Each lecture is of 45 minutes
Session: 2022-23	Course Title: Integral calculus and Vector Analysis	
PART-A		
Integral Calculus		
Unit	Topics	No of Lectures
I	Integral as a limit of sum, Properties of Definite integrals, Fundamental theorem of integral calculus, Summation of series by integration, Infinite integrals, Differentiation and integration under the integral sign.	12
II	Beta function, Properties and various forms, Gamma function, Recurrence formula and other relations, Relation between Beta and Gamma function, Evaluation of integrals using Beta and Gamma functions.	11
III	Double integrals, Repeated integrals, Evaluation of Double integrals, Double integral in polar coordinates, Change of variables, Change of order of integration in Double integrals, Triple integrals, Evaluation of Triple integrals, Dirichlet's theorem and its Liouville's extension.	12
IV	Area bounded by curves (quadrature), Rectification (length of curves), Volumes and Surfaces of Solids of revolution.	11

PART- B		
Vector Analysis		
Unit	Topics	No. of Lectures
V	Triple product, Reciprocal vectors, Product of four vectors, General equation of a Plane, Normal and Intercept forms, Two sides of a plane, Length of perpendicular from a point to a plane, Angle between two planes, System of planes.	11
VI	Direction Cosines and Direction ratios of a line, Projection on a straight line, Equation of a line, Symmetrical and unsymmetrical forms, Angle between a line and a plane, Coplanar lines, Lines of shortest distance, Length of perpendicular from a point to a line, Intersection of three planes, Transformation of coordinates.	12
VII	Ordinary differentiation of vectors, Velocity and Acceleration, Differential operator-Del, Gradient, Divergence and Curl.	11
VIII	Line, Surface and volume integrals, Simple applications of Gauss divergence theorem, Green's theorem and Stokes theorem (without proof).	10

Course outcomes:

CO1: The Programme outcome is to give foundation knowledge for the students to understand basics of mathematics including applied aspect for developing enhanced quantitative skills and pursuing higher mathematics and research as well.

CO2: By the time students complete the course they will have wide ranging application of the subject and have the knowledge of surface area and volume of shapes.

CO3: The main objective of the course is to equip the student with necessary analytic and technical skills. By applying the principles of integral he learns to solve a variety of practical problems in science and engineering.

CO4: The student is equipped with standard concepts and tools at an intermediate to advance level that will serve him well towards taking more advance level course in mathematics.