

 IILM University, Greater Noida	School	School of Sciences	Year:	I	Course Name	Applied Calculus	
 IILM UNIVERSITY	Program :	B.Tech. (CSE)	Semester:	I	Course Code	26SOSC103	
					L-T-P-C	2-1-0-3	
					Prerequisite Subject	Intermediate Mathematics	
Course Objectives		1. To develop a strong foundation in differential calculus of one and two variables, including differentiation techniques, mean value theorems, and Taylor expansions.					
		2. To enable students to analyze multivariable functions using partial derivatives, total derivatives, Jacobians, and optimization techniques.					
		3. To develop proficiency in evaluating multiple integrals and applying them to compute areas, volumes, and related engineering problems.					
		z. To introduce the fundamental concepts of vector calculus, including gradient, divergence, curl, directional derivatives, and line and surface integrals for engineering applications.					
Course Outcome (At the end of the course, students will be able to)		Description					
CO1		Apply differentiation techniques, mean value theorems, and Taylor's theorem to analyze functions of one and two variables.					
CO2		Solve multivariable calculus problems involving partial derivatives, total derivatives, Jacobians, homogeneous functions, and constrained optimization using Lagrange multipliers.					
CO3		Evaluate double and triple integrals and apply them to determine areas, volumes, and other engineering quantities.					
CO4		Analyze vector fields using gradient, divergence, curl, directional derivatives, and evaluate line and surface integrals in engineering contexts.					
Course Description		This course provides a comprehensive foundation in differential and integral calculus for single and multiple variables. Topics include limits, continuity, differentiation, Taylor and Maclaurin series expansions, partial derivatives, and multivariable optimization. Students will also study definite and indefinite integrals, double and triple integrals, and their applications to real-world problems.					
Detailed Syllabus							
Unit	Topics					CO No.	Number of lectures
Unit1:One Variable Calculus	Limit, Continuity, Differentiability for functions of single variable, Successive differentiation of standard functions, Rolle's theorem, Lagrange's mean value theorem, Taylor's theorem for one variable functions.					CO1	9
Unit 2: Two Variable Calculus	Limits, continuity and differentiability of functions of two variables, partial derivatives, total derivative, Euler's theorem for homogeneous functions, Taylor and Maclaurin series for functions of two variables					CO1	9
Unit 3: Applications of Differential Calculus	Maxima and minima of functions of two variables, Lagrange's method of multipliers, Gradient vector and Hessian matrices, Gradient descent algorithm, Newton's method for optimization, Simple and Multiple Linear regression through optimization.					CO2	10

