SARVAJANIK UNIVERSITY

SARVAJANIK COLLEGE OF ENGINEERING AND TECHNOLOGY

BACHELOR OF TECHNOLOGY

B. Tech.	I	Semester	I	Teaching Scheme				Evaluation Scheme	
Subject Name	Mathematics - 1			L	T	P	Credits	CCE	SEE
Subject Code	BTAS21105			3	1	-	4	50	50
Type of course	BSC: Basic Science Course			CCE : Continuous and Comprehensive Evaluation SEE : Semester End Evaluation					
Prerequisite	Fundamentals of Calculus, Algebra, Trigonometry, Geometry								
Rationale	The aim of this course is to develop a deep conceptual understanding while preserving the core principles of traditional calculus. As a foundational course, it primarily covers topics in single-variable and multivariable calculus, serving as a critical building block for understanding key concepts in fields such as science, engineering, economics, computer science, and other related disciplines.								

Course Outcomes (COs): At the end of the course, students will be able to		Marks % Weightage
CO – 1	define convergence or divergence of sequences and series and use the concepts in engineering field.	22
CO – 2	determine radius of convergence of the power series, identify indeterminate forms and find the limits, evaluate extreme values of the functions.	16
CO – 3	identify and evaluate the improper integrals including Beta and Gamma functions and find the surface area and volume of solid of revolution.	18
CO – 4	deal with functions of several variables that is essential in most branches of engineering.	22
CO – 5	use mathematical tools required in evaluating multiple integrals.	22

Course Contents

Unit	Content	Tentative Teaching Hours	Tentative Unit Weightage
1	**Unit 1: Sequences and Series** Sequence of numbers and its convergence. Convergence and divergence of an infinite series, geometric series, telescoping series, nth term test for divergent series, Combining series, Harmonic Series, integral test, The p - series, The Comparison test, The Limit Comparison test, Ratio test, Root test, Alternating series test,	10	22%

	Absolute and Conditional convergence.		
2	**Unit 2: Single – variable Calculus (Differentiation)** Introduction to Power series, Taylor's and Maclaurin's theorem for a function of one variable, linear approximations; Taylor's series and Maclaurin's series, convergence of Taylor's series. Indeterminate forms and L'Hospital's rule; Extreme values of functions.	7	16%
3	**Unit 3: Basic Calculus** Definite Integrals, Applications of definite integrals to evaluate surface areas and volumes of revolutions, Evaluation of improper integrals of type I and type II; Beta and Gamma functions and their properties.	8	18%
4	**Unit 4: Multivariable Calculus (Differentiation)** Limit, continuity and partial derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl, divergence and directional derivatives.	10	22%
5	**Unit 5: Multivariable Calculus (Integration)** Multiple Integration: Double integral, (Cartesian and polar), Change of order of integration, change of variables, Applications: Areas and volume, centre of mass and gravity (constant and variable densities). Triple integrals (Cartesian), Simple applications involving cubes , sphere and rectangular parallelepiped.	10	22%

Suggested Specification table with Marks

% Distribution of Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	30	20	0	30	0

Legend: **R:** Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above levels (Revised Bloom's Taxonomy)

Recommended Reference Books

1. G. B. Thomas and R.L. Finney, "Calculus and Analytic geometry", Pearson, Reprint, 9th Edition, 2002.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 9th Edition, 2006.
3. Veerarajan T., "Engineering Mathematics for first year", Tata McGraw-Hill, New Delhi, 1st Edition, 2008.
4. N. P. Bali and Manish Goyal, "A text book of Engineering Mathematics", Laxmi Publications, Reprint, 7thEdition, 2008.
5. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 36th Edition, 2010.

CO-PO-Mapping:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO – 1	3	3	2	2	1	1	1	-	-	-	-	1
CO – 2	3	3	2	2	1	1	1	-	-	-	-	1
CO – 3	3	3	3	3	2	1	1	-	-	-	-	2
CO – 4	3	3	2	2	2	1	1	-	-	-	-	2
CO – 5	3	3	3	3	2	1	1	-	-	-	-	2

List of Open Source/learning website/Other Details if any:

- https://nptel.ac.in/courses/111/105/111105121/
- https://nptel.ac.in/courses/111/105/111105134/