Name of Faculty	:	Faculty of Engineering & Technology
Name of Program	:	Bachelor of Technology (B. Tech)
Course Code	:	1BCU01
Course Title	:	Calculus
Type of Course	:	Basic Science (BS)
Year of Introduction	:	2023-24

Prerequisite	:	Trigonometry, Algebra , Calculus
Course Objective	:	To understand the rate of change, convergence, divergence, Cartesian and polar system.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	Understand the matrix use to solve any linear system of equations
	CO2	Understand different techniques to solve first order difference equation and behaviour of the student at future time.
	CO3	Understand the various and appropriate test for convergence of the sequence and series
	CO4	Understand how the improper integration can be solved
	CO5	Understand how area and volume can be find by double and triple integration

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
3	0	0	3	70	30	0	0	100

*Legends: **L**-Lecture; **T**–Tutorial/Teacher Guided Theory Practice; **P**–Practical,**C** – Credit, **SEE** – Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.))*

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping COs
1	Matrices Matrices and Elementary row operations , Row echelon and reduced row echelon form ,Rank by Row echelon form , Solution of System of linear equations by gauss elimination and gauss Jordan method	10	20%	CO1
2	First order ordinary differential equations	10	20%	CO2

	First order linear differential equation: Bernoulli's equation, Exact Differential equation, Equation reducible to Exact equation, Clairaut's equation.			
3	Infinite sequence and series Convergence of sequence and series, test for convergence of series, geometric series, P series, D'Alembert Ratio test, Cauchy's Root test. Taylor's Series, Maclaurin's series, Power series.	10	25%	CO3
4	Integration Improper integrals, Convergence and divergence of the improper integrals, Beta-Gamma functions and their properties.	6	15%	CO4
5	Multiple integration Double and triple integration, change of order of integration, Double integrals in polar co-ordinates , Chang of variables, Area by using double integration, Volume as triple integrals.	9	20%	CO5

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**20**	**35**	**20**	**10**	**10**	**5**

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Echelon and row Echelons	2
2	Rank of the matrix and solution of system of linear equation	2
3	Solution of Ordinary Differential equation	2
4	Exact and Non Exact differential equation	2
5	Convergence and divergence of sequence and series	2
6	Power series	2
7	Convergence and Divergence of improper integration	2
8	Beta and Gamma Functions	2
9	Double and Triple Integration	2
10	Application of Double and Triple Integration	2

Suggested Learning Websites

Sr. No.	Name of Website
1	https://semesters.in/engineering-mathematics-for-btech-first-year/
2	https://www.nptel.ac.in

3	https://tutorial.math.lamar.edu/classes/calci/calci.aspx
4	https://www.khanacademy.com

Reference Books

Sr. No.	Name of Reference Books
1	Erwin Kreyszig, Advanced Engineering mathematics, John Wiley, 10th Ed.
2	B. S Grewal, Higher Engineering Mathematics, (43rd Edition), Khanna Pub., Delhi
3	B V Ramana, Higher Engineering Mathematics; McGraw-Hill
4	D C Lay, Linear Algebra and its Application; Pearson Publication
5	Mathematics 1 By Dr R C Shah
6	R. K. Jain and S. R. K. Iyernagar, Advanced Engineering Mathematics, Alpha Science, 3rd Ed.