SARVAJANIK UNIVERSITY

SARVAJANIK COLLEGE OF ENGINEERING AND TECHNOLOGY

BACHELOR OF TECHNOLOGY

B. Tech.	I	Semester	II	Teaching Scheme				Evaluation Scheme	
Subject Name	Mathematics - 2			**L**	**T**	**P**	**Credits**	**CCE**	**SEE**
Subject Code	BTAS21201			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, Complex numbers								
Rationale	Mathematics is essential for formulating, solving, and analysing engineering problems. Complex analysis offers valuable insights into mathematical theory and has practical applications in engineering, and various other science fields.								

Course Outcomes (COs): At the end of the course, students will be able to		**Marks % Weightage**
CO – 1	solve the system of linear equations, apply essential tools of matrices in finding eigen values and diagonalization.	22
CO – 2	demonstrate mathematical model, identify appropriate methods to solve the first order Differential equations and interpret the results.	18
CO – 3	identify appropriate methods to solve higher order ordinary differential equations, calculate optimal solution(s) and apply techniques to the real-world problems.	22
CO – 4	find differentiation of functions of a complex variable that are used in various applications, which deals with engineering problems.	22
CO – 5	represent functions as Taylor's series and evaluate complex contour integrals.	16

Course Contents

Unit	Content	Tentative Teaching Hours	Tentative Unit Weightage
1	**Unit 1: Matrices** Elementary row operations in Matrix, Row echelon and Reduced row echelon forms, Rank of a Matrix, Inverse of a matrix by Gauss-Jordan method, System of linear equations, Symmetric, Skew-Symmetric and Orthogonal Matrices, Eigen values and Eigen vectors of a matrix, Diagonalization of a matrix, Cayley-Hamilton theorem.	10	22%

2	**Unit 2: First Order Ordinary Differential Equations** Exact and Non-Exact Differential equations, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.	8	18%
3	**Unit 2: Ordinary Differential Equations of Higher Orders** Higher order linear differential equations with constant and variable coefficients, method of variation of parameters, method of undetermined coefficients, Cauchy-Euler equation; Classification of Ordinary and Singular points, Power series solutions for ordinary points.	10	22%
4	**Unit 4: Complex Variable – Differentiation** Polar form of complex number, Power & roots of complex numbers, Complex Differentiation & Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Mobius transformations .	11	22%
5	**Unit 5: Complex Variable – Integration and Expansion** Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof); Taylor's series.	6	16%

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

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

Recommended Reference Books

1 Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 9th Edition, 2006.

2 Ross Shepley, "Introduction to Ordinary Differential Equations", John Wiley & sons, 4th Edition, 1989.

3 N. P. Bali and Manish Goyal, "A text book of Engineering Mathematics", Laxmi Publications, Reprint, 7thEdition, 2008.

4 B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 36th Edition, 2010.

5 J. W. Brown and R. V. Churchill, " Complex Variables and Applications", Mc-Graw Hill, 8th Edition , 2014.

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	3	3	2	1	1	-	-	-	-	1
CO – 2	3	3	3	3	3	1	1	-	-	-	-	1
CO – 3	3	3	3	3	2	1	1	-	-	-	-	2
CO – 4	3	3	3	3	3	1	1	-	-	-	-	1
CO – 5	3	3	3	3	2	1	1	-	-	-	-	1

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/
- https://archive.nptel.ac.in/courses/122/107/122107036/