



C.U.SHAH UNIVERSITY – WADHWANCITY

FACULTY OF: - Technology & Engineering

DEPARTMENT OF: - CE/IT/EC/MECH/EEE/AUTO/IC/EE/CIVIL

SEMESTER: - I

CODE: - 4TE01EMT2

NAME – Engineering Mathematics-1

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Schemes (Hours)				Credits	Evaluation Schemes							
		Th	Tu	Pr	To		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hours	Marks	Hours	Pr	TW	Pr	
4TE01EMT2	Engineering Mathematics-1	4	0	0	4	4	30	1.5	70	3	-	-	-	100

Objectives:-

- To learn the concept of higher order derivatives and Partial derivatives
- To derive series expansion of some standard functions
- Learn to trace the curves: Cartesian and polar
- To learn concept of Matrix Algebra and apply it to find solution of system of Linear Equations and eigen value problems
- To learn algebra of Complex numbers

Prerequisite:-

Students should have a firm grasp of algebra and trigonometry. They should have the basic knowledge of Complex Numbers, Derivative, Determinants and matrices.

Course Outline:-

Sr. No.	Course Content	Hours
1	Successive Differentiation: Higher order derivatives and some problems based on it. Some standard results on n^{th} derivative and problems based on it. Leibnitz's theorem and problems based on it.	10
2	Expansion: Maclaurin's theorem and problems based on it. Taylor's theorem and problems based on it.	8
3	Indeterminate forms: Review of limit, L- Hospital's rule, Indeterminate forms $\frac{0}{0}, \frac{\infty}{\infty}, 0 \times \infty, \infty - \infty, 0^0, \infty^0, 1^\infty$	6



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4	Partial Differentiation & its applications: Limit, Continuity of functions of several variables, Partial derivatives, Total Derivative, Homogeneous Functions, Euler's theorem, Differentiation of implicit functions, Jacobian, error and approximation, maxima and minima.	12
5	Complex Numbers: Algebra of complex numbers, Modulus, Arguments, Polar Form, De' Moivre's theorem, Expansion of $\cos n\theta$, $\sin n\theta$ in powers of $\cos \theta$ and $\sin \theta$, Roots of complex numbers, Solutions of Quadratic equations, Circular functions, Hyperbolic functions, Relation between circular and hyperbolic functions, logarithm of a complex number.	12
6	Matrices: Types of Matrices, Elementary row operation, Rank of a matrix, Normal form, Consistency of system of simultaneous linear equations, Inverse of a matrix by Gauss Jordan method, Linearly dependent and independent vectors, Eigen values and eigen vectors, Cayley Hamilton theorem.	12

Learning Outcomes:

After the successful completion of the course, students will be able to

- Apply the knowledge of differential calculus in real world problems.
- Solve the system of simultaneous linear equations
- Find the complex roots of algebraic equation
- Understand the topics in higher engineering mathematics.

Teaching & Learning Methodology:

- Lecture method using standard teaching aids.
- Solving term assignments in tutorials.
- Quiz/Seminar/Expert lectures

Books Recommended:

1. E. Kreyszig, Advanced Engineering Mathematics (8th Edition), Wiley-India (1999)
2. Higher Engineering Mathematics, Thirty-fifth edition. B. S. Grewal, Khanna Publication.
3. Higher Engineering Mathematics – Vol. 1, Dr.K.R.Kachot, Mahajan Publ. house
4. Thomas' Calculus, Maurice D. Weir, Joel Hass, Frank R. Giordano, Person Education.
5. Calculus, James Stewart, Thomson (5th Edition, 2003).
6. T. M. Apostol, Calculus, Volumes 1 and 2 (2nd Edition), Wiley Eastern (1980).

E-Resources:

1. <http://www.calculus.org/>



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2. <http://archives.math.utk.edu/calculus/crol.html>
3. <http://www.distancecalculus.com/calculus1/>
4. www.pearsoned.co.in/mauricedweir
5. <http://mathworld.wolfram.com/ComplexNumber.html>