C. U. SHAH UNIVERSITY
Wadhwancity

FACULTY OF:- Technology and Engineering
DEPARTMENT OF: - CE/IT/EC/MECH/EEE/AUTO/IC/EE/CIVIL
SEMESTER: - I
CODE: - 4TE01EMT3
NAME: – Engineering Mathematics - 1

Teaching and Evaluation Scheme:-

Subject code	Subject name	Teaching Scheme(Hours)				Credits	Evaluation Scheme							
							Theory				Practical/Tutorial			Total
							Sessional Exam		University Exam		Internal		Total	
		Th	Tu	Pr	Total		Marks	Hours	Marks	Hours	Pr/Viva	Tw		
4TE01EMT3	Engineering Mathematics - 1	3	2	0	5	4	30	1.5	70	3	30	20	50	150

Objectives:-

- To learn the concept of higher order derivatives and Partial derivatives
- To derive series expansion of some standard functions
- 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

Prerequisites:-

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 contents
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
2	**Expansion:** Maclaurin's theorem and problems based on it, Standard expansion, Taylor's theorem and problems based on it
3	**Indeterminate form:** Review of limit, L- Hospital's rule, Indeterminate forms $\frac{0}{0}, \frac{\infty}{\infty}, o \times \infty,$ $\infty - \infty, 0^0, \infty^0, 1^\infty$
4	**Partial Differentiation & Application of partial derivatives:** Limit, Continuity of functions of several variables, Partial derivatives, Total Derivative, Homogeneous Functions, Euler's theorem (without proof), Differentiation of implicit functions, Jacobian, error and approximation, maxima and minima
5	**Complex Numbers:** Review of complex numbers: Algebra of complex numbers, Modulus, Argument and polar form, De' Moivre's theorem (without proof), 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
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

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

E-Recourses:-

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