20MA101T					Mathematics - I					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs. / Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	0	4	4	25	50	25	--	--	100

COURSE OBJECTIVES

- To be able to evaluate problems related to differential and integral calculus of complex functions.
- To be able to obtain area, volume using integral calculus.
- To be able to formulate and solve various engineering problems using the calculus.
- To study the properties of Matrix algebra and apply them to solve system of algebraic equations.

UNIT 1 DIFFERENTIAL CALCULUS AND ITS APPLICATIONS **08 Hrs.**

Partial derivative and its application, - Euler's theorem - Total derivatives - Jacobians – Maxima and Minima of two variables using Lagrange's multipliers. Convergence of power series.

UNIT 2 INTEGRAL CALCULUS AND ITS APPLICATIONS **12 Hrs.**

Definition Evaluation of double integral (Cartesian – Polar form) – Change of orders - Change of variables – Evaluation of triple integral, change of variables (Cartesian to spherical – and cylindrical) – Applications, area – volume – center of mass – center of gravity by double and triple integral.

UNIT 3 MATRIX ALGEBRA AND ITS APPLICATIONS **10 Hrs.**

Solution of system of algebraic equation - Rank of a matrix, consistency of system of equation - Characteristic equation of a square matrix- Eigen values and Eigenvectors of a real matrix - Properties of eigen values and eigen vectors - Cayley-Hamilton theorem (without proof) - finding inverse of a matrix - Diagonalization of a matrix using orthogonal transformation.

UNIT 4 VECTOR CALCULUS **10 Hrs.**

Gradient, divergence and curl – Directional derivative – Irrotational and Solenoidal vector fields – Vector Integration – Simple problems on line, surface and volume integrals – Green's theorem in a plane, Gauss divergence theorem and Stokes' theorem (without proofs) – Simple application involving cubes and rectangular parallelepipeds.

40 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 – Identify the use of convergence of infinite series in engineering aspects.
CO2 – Understand the concept of Directional derivative, Irrotational and Solenoidal vector fields.
CO3 – Apply appropriate tool/method to extract the solutions of engineering problems.
CO4 – Analyze the obtained solution in context with theory.
CO5 – Appraise mathematical problems from real to complex domain.
CO6 – Evaluate problems on Green's, Stokes' and Divergence theorems.

TEXT / REFERENCE BOOKS

1. B. S Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Pub., Delhi, 2014.
2. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, Alpha Science, 3rd Ed., 2007.
3. Erwin Kreyszig, Advanced Engineering mathematics, John Wiley, 10th Ed., 2015.
4. G. Strang, Linear Algebra and its applications, 4th Edition, Cengage Learning, 2005.
5. K. Hoffman and R. A. Kunze, Linear Algebra, Prentice Hall of India, 2002.