19MA 201T MATHEMATICS-III										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs./Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	---	4	4	25	50	25	---	---	100

COURSE OBJECTIVES:

1. To understand basic concepts of matrices and system of equations.
2. To adapt the notion of vector space and Inner Product Space.
3. To formulate PDEs and study various methods of solving linear and non-linear PDEs.
4 To make use of second order Partial Differential Equations in several engineering applications.

UNIT- I **[12]**

Systems of linear equations : Matrices , Matrix Operations, Special matrices, Elementary Matrices, Elementary transformation, Rank, Introduction to systems of Linear Equations, Conditions for consistency of the system, Solution by Gauss and Gauss Jordan Elimination Method, Solving system of equation using inverse of a Matrix and Cramer's rule, Eigen Values, Eigen Vectors, Cayley-Hamilton Theorem, Similarity of Matrices, Diagonalization of a Matrix.

UNIT- II **[13]**

Vector spaces: Basics of n – dimensional Euclidean space, Vector Space, Subspace, Linearly Independent and Dependent Vectors, Basis and Dimension, Row space, column space and rank of a matrix, null space, Linear Transformation, Matrix representation of a Linear Transformation, Range, Rank, Kernel and Nullity of Linear Transformation, Dimension Theorem, Inner product spaces, Gram-Schmidt process, Least squares approximation.

UNIT- III **[7]**

Partial Differential Equations: Formation of P.D.E, Equations solvable by direct integration, Linear and non-linear equations of first order, Lagrange's equations. Homogeneous and non-homogeneous linear P.D.E. with constant coefficients. Rules for finding C.F. & P.I.

UNIT- IV **[7]**

Partial Differential Equations and its Applications: Classification of partial differential equations, solutions of one dimensional wave equation, one dimensional unsteady heat flow equation in Cartesian and polar coordinates by variable separable method with reference to Fourier trigonometric series.

Tutorials **[13]**

TOTAL **52 Hours**

Text Book & References:

1. R.K. Jain & S.R.K. Iyenger, Advanced Engineering Mathematics, 3rdEd., Narosa (2002).
2. E. Kreyszig, Advanced engineering mathematics (8th Ed.), John Wiley (1999).
3 Ordinary and Partial Differential Equations by M.D. Raisinghania, 8th edition, S. Chand Publication (2010)
4. H. Anton, Elementary linear algebra with applications (8th ed.), John Wiley (1995)
5. G. Strang, Linear algebra and its applications (4th Ed.), Thomson (2006)

COURSE OUTCOMES:

(1) Formulate and solve system of linear equations using Gaussian methods and further diagonalization of matrices.
(2) Understand the concept of vector space, mapping between vector spaces, basis and inner product spaces.
(3) Formulate PDEs and study various methods of solving linear and non-linear PDEs.
(4) Classify the second order Partial Differential Equations and solve their Cartesian or Polar forms analytically via separation of variables.