COURSE OBJECTIVE:

(1) To impart knowledge of basic and applied sciences.

(2) To connect linear algebra to other fields both within and without mathematics.

(3) To introduce students the theory and concepts of linear algebra, Fourier Series, Special Functions and Applications of Partial Differential Equations which will equip them with adequate knowledge of mathematics to formulate and solve problems analytically.

(4) Apply Fourier series expansion to different kind of wave forms and solve some partial differential equations using Fourier series

16MA 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

UNIT I **8**

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.

UNIT II **13**

Vector spaces: Euclidean n - space, Linear Transformations from R^n to R^m; Properties Linear Transformations from R^n to R^m, Matrices of General Linear Transformations, Similarity; Isomorphisim, Vector space and Subspaces, Linear dependence and Independence; Basis Dimension, Row space; null space; column space and rank of a matrix, Rank and Nullity, Dimension Theorem, Inner product spaces, Eigen values and Eigen vectors, Inner products , Angle and Orthogonality in Inner Product Spaces, Orthonormal Bases; Gram-Schmidt process; Least squares approximation, Orthogonal Matrices, Eigen values and Eigen vectors, Diagonalization.

UNIT III **13**

Fourier Series: Periodic functions, Euler's formulae, Dirichlet's conditions, expansion of even and odd functions, half range Fourier series, Perseval's formula, complex form of Fourier series.

Special Functions: Power series method to solve the equation, Frobenius method for solution near regular singular points, Legendre's equation, Legendre polynomials, Rodrigue's formula, Bessel's equation and orthogonality.

UNIT IV **05**

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 and by Laplace transform technique

APPROXIMATE TOTAL 39 Hours

Texts and References

1. Higher Engineering Mathematics, R. K. Jain & S. R. K. Iyernagar.
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 (4rh Ed.), Thomson (2006)

Course Outcome:

At the end of the course, the student will be able to:

(1) Solve a system of linear equations by gauss elimination method and find the inverse of a matrix.
(2) Diagonalize a matrix using its eigenvectors.
(3) Formulate Fourier series for various wave forms and solve some partial differential equations using Fourier series.
(4) Become familiar with various applications of partial differential equations and their solution methods.