FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Bachelor of Technology
In Effect from Academic Year 2016-17

Subject Code: 1ET1000109	**Subject Title: Linear Algebra**
Pre-requisite Subject	**Calculus**

Course Objective:
To understand the applications of matrices to engineering problems. To apply knowledge of matrices in various applications of relevant branch.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory		Practical		
Lecture	Tutorial	Practical	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total
3	2	-	5	70	30	-	-	100

Subject Contents			
Sr. No	**Topic**	**Total Hours**	**Weightage (%)**
1.	**Beta and Gamma function:** Gamma function, Beta function, Relation between Beta and Gamma functions and their properties.	3	7
2.	**Vectors in R^n and its properties:** Vectors in R^n, Dot Product, Norm and Distance, Cauchy-Schwartz Inequality, Triangle Inequality, Pythagorean Theorem	3	7
3.	**Matrices and System of Linear Equations:** Revision, Rank of a matrix, Normal form of a matrix, Consistency of system of linear equations and Examples.	5	12
4.	**Vector Spaces:** Definition, Examples of vector spaces, Vector subspace, Linear Independence and dependence, Linear span of set of vectors, Basis and Dimension, Extension to basis, Row space, Column space, Null space of a matrix, Rank and nullity of a matrix, Dimension Theorem (Rank – Nullity theorem)	10	24
5.	**Eigenvalues and Eigenvectors:** Eigen values and Eigen vectors, Eigen space of a matrix, Algebraic and Geometric multiplicity, Diagonalization, Orthogonal Diagonalization, Power of a matrix, Cayley-Hamilton Theorem, Application to Quadratic forms	6	14
6.	**Inner Product Spaces:** Inner Product, Dot Product on R^n, Inner Product Spaces, Orthonormal Bases, Orthogonal Complements, Projection Theorem, Gram-Schmidtz Process, Applications to Least Squares.	7	17
7.	**Infinite Series:** Definition of a sequence, Divergence and Convergence of a sequence, Sandwich Theorem for sequences, Infinite Series, Comparison test, Cauchy's integral test, De' Alembert's ratio test, Cauchy's root test, Leibniz's rule for alternating series, Power series, Range of convergence, Uniform convergence.	8	19

Course Outcome:

- Students will be able to apply matrices to engineering problems of their relevant branches after studying this course.

List of References:

1. Elementary Linear Algebra, Applications version, Anton and Rorres, Wiley India Edition, Ninth Edition.
2. Calculus, Volume 2, T. M. Apostol, Wiley Eastern. Second Edition.
3. Introduction to Linear Algebra with Application, Jim Defranza, Daniel Gagliardi, Tata McGraw-Hill, First Edition
4. Advanced Engineering Mathematics, Erwin Kreysig, Wiley Publication, 9th Edition
5. Linear Algebra and its Applications, Gilbert Strang, Cengage Learning, Fourth Edition.

E-Resources:

1. NPTEL Video Lectures. www.nptel.ac.in
2. MIT Open Course Ware
   Link:http://ocw.mit.edu/courses/mathematics/18-06-linear-algebraspring2010/videolectures/
3. MIT Open Course Ware
   Link:http://ocw.mit.edu/courses/mathematics/18-02-multivariable-calculus-fall- 2007/video-lectures/