LINEAR ALGEBRA AND PROBABILITY THEORY

Course Code:24PMAT11B	CIE Marks:50
Contact Hours/week:03	SEE Marks:50
Total Hours:40	Exam Hours:03
Semester: I	Credits:03(3:0:0)

Course Learning Objectives: This course will enable the students:

- To introduce linear algebra in a best suitable approach for solving large number of equations.
- To understand vector spaces and related topics arising in magnification and rotation of images.
- Use probability formulations for new predictions with discrete and continuous RV's.

Course content:

Module-I
Linear Algebra: System of Linear Algebraic equations by triangularization method , Cholesky method, Partitions method, Gauss Jacobi, Gauss- Siedel's method and Power method for eigen values and eigen vectors.(RBT Levels:L1&L2)   [8 hours]

Module-II
Vector Spaces: Geometry of system of linear equations, Vector spaces and subspaces, basis and dimension, four fundamental subspaces, Rank – Nullity theorem(without proof),linear transformation. Orthogonal Vectors and subspaces, projections and least squares, orthogonal bases and Gram-Schmidt orthogonalization .
.(RBT Levels:L2&L3)   [8 hours]

Module-III
Probability-I: Random variables, probability mass and probability distribution function, Probability distributions: Binomial, Normal and Gaussian distributions & examples.
.(RBT Levels:L2&L3)   [8 hours]

Module-IV
Probability-II: Random variables, s, joint probability distribution(discrete and continuous)-Illustrative examples, Probability vectors, stochastic matrices, fixed points, regular stochastic matrices.
.(RBT Levels:L2&L3)   [8 hours]

Module-V
Sampling Theory: Testing of hypothesis: t-distribution test, Chi square test and F-test. Analysis of Variance (ANOVA):one way classification.
(RBT Levels:L2&L3)   [8 hours]

Course Outcomes:

At the end of this course, students will be able to:

CO1.Acquire the idea of significant figures, types of errors during numerical computation and Solve system of linear equations using direct and iterative methods.

CO2. Estimate orthogonality of vector spaces, Cumulative distribution function and characteristic function. Recognize problems which involve these concepts in Engineering applications..

CO3. Describe the basic notions of discrete and continuous probability distributions.

CO4. Describe the basic notions of discrete and continuous joint probability distributions.

CO5. Understand statistical and probabilistic concepts required to test the hypothesis

Reference Books:

1.S.S .Shastry, Introductory Methods of Numerical Analysis , PHI, 2005.
2.David C. Lay, "Linear Algebra and its applications", 3rd Edition , Pearson Education, 2002.
3.H.K. Dash , Er. Rajnish Verma, "Hiigher Engineering Mathematics', S.Chand Publishers, 3rd Edition,2014
4.Kenneth Hoffman and Ray Kunze, "Linear Algebra", 2nd Edition,PHI, 2011
5.B.S. Grewal, "Numerical Methods in Engineering & Science",Khanna Publishers, 2015.
6.R.D. Sharma, "Theory and problems of Linear Algebra",I.K. International Publishing House Pvt. Ltd, 2010