SDM COLLEGE OF ENGINEERING & TECHNOLOGY, DHARWAD
M.Tech in Data Mining & Machine Learning (Inf.Sc)
Applied Mathematics

Course Code: 18PITEC101	**CIE Marks: 50**
Contact Hours/Week: 04	**SEE Marks: 100**
Total Hours: 52	**Exam Hours: 03**
Semester: I	**Credits: 04**

Course Learning Objectives: This course will enable students to Acquaint with principles of Linear Algebra, Probability and its distribution, Random Process and apply the knowledge in the applications of Data mining and Machine Learning Engineering sciences.

Course Outcomes (COs): Upon the completion of the course, the student should be able to

CO-1	Solve problems involving basic probability and apply to measure information quality and quantity.
CO-2	Apply the knowledge of different probability distribution in machine learning and Data mining Concepts.
CO-3	Calculate correlation, regression coefficients.
CO-4	Use Least squares method to compute time series and also uses the concept of SVD in PCA.

CONTENTS

CHAPTER-I

Probability: Definitions of probability, Addition theorem, Conditional probability, Multiplication theorem, Bayes theorem of probability. **10Hrs**

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CHAPTER-II

Random variables and their properties: Discrete Random variable, Continuous Random variable, Probability Distribution joint probability distributions their properties, Transformation variables, Mathematical expectations, probability generating functions.

10 Hrs

CHAPTER-III

Probability Distributions / Discrete distributions: Binomial, Poisson Negative binominal distributions and their properties. (Definition, mean, variance, moment generating function. Additive properties, fitting of the distribution.) Continuous distributions: Uniform, Normal, exponential distributions and their properties. **10Hrs**

CHAPTER-IV

Curve fitting using Principle of Least Squares. Multivariate Analysis: Correlation, correlation coefficient, Rank correlation, Regression Analysis, Multiple Regression, Attributes, coefficient of Association, $\chi 2$ – test for goodness of fit, test for independence. **12Hrs**

CHAPTER-V

Linear Algebra: Computation of Eigen values and Eigen vectors of real symmetric matrices-Given's method. Orthogonal vectors and orthogonal bases. Gram-Schmidt orthogonalization process. QR decomposition, singular value decomposition, least square approximations.

10 Hrs

Reference Book:

Probability & Statistics with Reliability, Queuing and Computer Applications by Kishor S. Trivedi , Prentice Hall of India ,1999

An Introduction to Probability and Statistics by V.K. Rohatgi & A.K. Md.E.Saleh.

Richard Bronson, "Schaum's Outlines of Theory and Problems of Matrix Operations", McGraw-Hill, 1988.

Probability, Statistics and Random Processes by T. Veerarajan, Tata McGraw Hil

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1 to 3 and mention any additional POs)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
CO-1	Solve problems involving basic probability and apply to measure information quality and quantity.	1		
CO-2	Apply the knowledge of different probability distribution in machine learning and Data mining Concepts.	2	1	
CO-3	Calculate correlation, regression coefficients.	1	2	
CO-4	Use Least squares method to compute time series	3	1	

POs	**PO-1**	**PO-2**	**PO-3**
Mapping Level	2.5	2.5	3

1. Introductory (Slight); 2 . Reinforce (Moderate); 3. Mastering (Substantial)