Course Code	Course Title	C	H	I	E	T
17U5MME1	Probability Theory	7	6	25	75	100

Learning Objectives

- To impart the knowledge of fundamental concepts in Probability & Statistics to solve applied problems.
- To acquire the knowledge of various distributions and its applications.

Learning Outcomes

On satisfying the requirement of this course, students will be able to

- Extend and formalise knowledge of the theory of probability and random variables.
- Compute conditional probabilities directly and using Baye's theorem and check for independence of events.
- Perform probability calculations relating to probability distributions for discrete random variables.
- Perform probability calculations relating to probability density functions for continuous random variables.
- Compute Mathematical Expectation and variance.
- Apply various distributions to solve real life problems.

Unit I Probability

Introduction– Sample space – Events– The probability of an event– Some rules of probability – Conditional probability– Independent events–Baye's theorem – Problems.

Unit II Probability distribution & Probability density function

Introduction– Probability distribution – Continuous random variables – Probability density functions – Multivariate distribution – Marginal distributions – Conditional distributions.

Unit III Mathematical Expectations

Introduction – Expected value of random variable– Moments –Chebychev's theorem – Moment generating functions – Product moments – Moments of linear combination of random variables – Conditional expectations.

Unit IV Special Probability Distribution

Introduction **–** Discrete uniform distributions, Bernoulli's distribution –Binomial distribution – Negative binomial and Geometric distribution– Hyper geometric distribution– Poisson distribution – Multinomial distribution – The Multivariance Hyper geometric distribution.

Unit V Special Probability Densities

Introduction – Uniform distribution – Gamma, Exponential and Chi-square distribution – Beta distribution– Normal distribution – Normal approximation to Binomial distribution.

Text book:

John E. Freund's, Irwin miller, and Marylees Miller, Mathematical statistics with applications, 7th Edition 2007, Pearson.

Chapters: 2(2.1– 2.8), 3(3.1– 3.7), 4(4.2– 4.8), 5(5.2– 5.7), 6(6.2– 6.6).

Reference Books:

1. T. Veerarajan, Probability and Random Processes,11th Reprint 2007, Tata McGraw – Hill Publishing Company limited.
2. S.C. Gupta and V.K. Kapoor,Fundamentals of Mathematical statistics, 1996, S. Chand & Sons.