STANLEY
COLLEGE OF ENGINEERING & TECHNOLOGY FOR WOMEN
( Approved by AICTE , New Delhi | Affiliated to Osmania University ,Hyderabad)
Address : Chapel Road, Abids ,Hyderabad

**BIT 251**

## PROBABILITY AND RANDOM PROCESSES

**Course Objectives:**

1. To induce the ability to describe a random experiment in terms of procedure, observation, and a Probability model.
2. To inculcate ability to characterize functions of random variables
3. To familiarize the students with the methods to characterize stochastic processes with an emphasis on stationary random processes.

**UNIT – I**

The meaning of Probability – Introduction- the definitions – Probability and Induction – Causality versus Randomness.

The Axioms of Probability: Set theory – Probability Space – Conditional Probability. Repeated Trials: Combined Experiments – Bernoulli Trials – Bernoulli's theorem and games of chance.

**UNIT – II**

The Concept of a Random Variable: Introduction – Distribution and Density functions- Specific Random Variables – Conditional Distributions – Asymptotic Approximations for Binomial Random variables.

Functions of One Random Variables: The Random Variable g(x) – The Distribution of g(x) – Mean and Variance – Moments – Characteristic Functions.

**UNIT – III**

Two Random Variables: Bivariate Distributions – One Function of Two Random Variables – Two Function of Two Random Variables – Joint Moments – Joint Characteristic Functions – Conditional Distributions – Conditional Excepted Values.

**UNIT – IV**

Random Processes – Definitions – Basic concepts and examples – Stationarity and ergodicity – Second order processes – Weakly stationary processes – Covariance functions and their properties – Spectral representation Weiner – Kintchine theorem.

**UNIT –V**

Linear Operations: Gaussian processes – Poisson Processes – Low pass and Band pass noise representations.

**Suggested Reading:**


1. Papoulis: Probability, Random Variables and Stochastic Processes, 4th Edition Tata McGraw Hill, 2002
2. T.Veerarajan, "Probability, Statistics and Random Process", 3rd Edition Tata McGraw Hill
3. Peyton Peebles: Probability, Random Variables and Random Signal Principles, Fourth Edition, Tata McGraw Hill
4. H.Stark and J Woods: Probability, Random Processes and Estimation Theory for Engineers, Prentice Hall.