| 4th Semester | REC4G001 | Probability Theory And Stochastic Process | L-T-P 3-0-0 | 3 CREDITS |
|---|---|---|---|---|

**MODULE – I (12 Hours)**

Sets and set operations; Probability space; Conditional probability and Bayes theorem;Combinatorial probability and sampling models.

**MODULE – II (12 Hours)**

Discrete random variables, probability mass function, probability distribution function,example random variables and distributions; Continuous random variables, probability density function, probability distribution function, example distributions;

**MODULE – III (8 hours)**

Joint distributions, functions of one and two random variables, moments of randomvariables; Conditional distribution, densities and moments; Characteristic functions of a random variable; Markov, Chebyshev and Chernoff bounds.

**MODULE – IV (7 hours)**

Random sequences and modes of convergence (everywhere, almost everywhere,probability, distribution and mean square); Limit theorems; Strong and weak laws of large numbers, central limit theorem.

**MODULE – V (6 hours)**

Random process. Stationary processes. Mean and covariance functions. Ergodicity.Transmission of random process through LTI. Power spectral density.

**Books:**


- H. Stark and J. Woods, ``Probability and Random Processes with Applications to Signal Processing," Third Edition, Pearson Education
- A.Papoulis and S. Unnikrishnan Pillai, ``Probability, Random Variables and Stochastic Processes," Fourth Edition, McGraw Hill.
- K. L. Chung, Introduction to Probability Theory with Stochastic Processes, Springer International
- P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability, UBS Publishers,
- P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Stochastic Processes, UBS Publishers
- S. Ross, Introduction to Stochastic Models, Harcourt Asia, Academic Press.


**Course Outcomes:**

At the end of this course students will demonstrate the ability to

1. Understand representation of random signals
2. Investigate characteristics of random processes
3. Make use of theorems related to random signals
4. To understand propagation of random signals in LTI systems.