

I	Course Code	<b>MA 192003</b>
II	Course Title	<b>Probability and Random Processes</b>
III	Credit Structure	L      T      P      C 3      1      0      4
IV	Prerequisites (If any)	
V	Course Content	Sets and set operations; probability space, Additive and multiplicative laws of probability. Conditional probability and Bayes theorem; Combinatorial probability and sampling models. Random Variables; discrete and Continuous random variables, probability mass function, cumulative distribution function, probability density function, examples of random variables and Some standard distributions; Binomial, Poison, Uniform and Normal distributions. Generating functions and moments. Limit theorems, Strong and weak laws of large numbers, central limit theorem. Joint distributions, functions of one and two random variables. Joint moments, random vectors, Independence of random variables, correlation matrix, covariance matrix, Gaussian random vectors, scaling and translation, Standard Gaussian, Joint Gaussianity, linear transformation. Gaussian random vectors, Conditional distribution, densities and moments. Random processes, basic definitions; second-order statistics, Wide-sense stationarity and strict stationarity, Ergodicity. Power spectral density, Gaussian random processes, Noise modeling.
VI	References	<ol style="list-style-type: none"> <li>1. Introduction to probability and statistics for engineers and scientists; Sheldon M. Ross.</li> <li>2. A first course in probability; Sheldon M. Ross.</li> <li>3. Stochastic processes; Sheldon M. Ross.</li> <li>4. Introduction to probability and statistics; Vijay K. Rohatgi, A. K. Md. Ehsanes Saleh.</li> </ol>