

MT-533	Probability and Stochastic Processes
	<p><u>Experiments, Models, and Probability:</u> Set theory, Applying set theory to probability, Probability axioms, Some consequences of the axioms, Conditional probability, Independence, Sequential experiments and tree diagrams, Counting methods, Independent trials.</p> <p><u>Random Variables:</u> Definitions, Probability mass and density functions, Cumulative distribution functions, Averages, Functions of a random variable, Expected value of a derived random variable, Variance and standard deviation, Conditional random variable and probability function, Gaussian random variables, Mixed random variables, Probability models of derived random variables.</p> <p><u>Pairs of Random Variables:</u> Joint cumulative distribution function, Joint probability mass function, Marginal PMF, Joint probability, Density function, Marginal PDF, Functions of two random variables, Expected values, Conditioning by a random variable, Independent random variables.</p> <p><u>Stochastic Process:</u> Introduction, Types of stochastic process, Random variables from random process, Independent identically distributed random sequences, Expected value and correlation, Stationary processes, Wide sense stationary stochastic processes, Cross-correlation.</p> <p><u>Random Signal Processing:</u> Linear filtering of a continuous-time stochastic process, Power spectral density of a continuous-time process, Cross spectral density, Frequency domain filter relationship.</p> <p><u>Markov Chains and Renewal Processes:</u> Markov process, Poisson process, Pure death process, Pure birth process, Renewal process, Branching process, Wiener process, Queuing theory, Characteristics of queuing system, Simple queues, Multiple service channels, Optimization of queuing systems.</p> <p><u>Reference Books:</u></p> <ol style="list-style-type: none"> 1. Yates R.D and Goodman D.J, <i>Probability and Stochastic Process</i>, 2nd Edition, John Willey & Sons Inc, 2005. 2. Peebles P.Z Jr, <i>Probability, Random Variables and Random Signal Principles</i>, 4th Edition, Mcgraw-Hill, New York, 2001. 3. Stark H and Woods J.W, <i>Probability and Random Processes with Applications to Signal Processing</i>, 3rd Edition, Prentice Hall, 2002. 4. Garcia A.L, <i>Probability, Statistics and Random Processes for Electrical Engineering</i>, 3rd Edition, Prentice Hall, 2008.