

University of Massachusetts Lowell  
**16.584 Probability and Random Processes**

Electrical and Computer Engineering  
**Fall 2016**

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Text & References: Intuitive Probability and Random Processes using MATLAB, Steven Kay, Kluwer Academic Publishers

Course Web Site: <http://morse.uml.edu/Activities.d/probability/probab584.html>

9/12	Chapters 1 & 2: Course Overview; Probability Modeling; Simulation Methods
9/19	Chapter 3: Sample Space, Axiomatic Definition, Combinatorics, Bernoulli Trials, Binomial Probability Law
9/26	Chapter 4: Joint, Conditional & Total Probabilities, Independence, Bayes Theorem
9/28	Chapters 5 & 6: Discrete Random Variables, Probability Mass Functions, Cumulative Distribution Functions, Expected Values and Moments; Characteristic Functions ; Functions of RVs
10/03	Chapters 7, 8 & 9: Multiple Random Variables; Joint Probability Distributions; Conditional Probability Distributions
10/11	Chapter 10: Continuous RVs; Probability Density Functions ; Mixed Random Variables; Transformation of RVs
10/17	Chapter 11: Moments of Cont. RVs; Chebyshev and Schwartz Inequalities, Chernoff Bounds & Characteristic Functions
10/24	Chapters 12 & 13: Vector Random Variables, transformations, expectation vectors and covariance matrices, diagonalization, multidimensional Gaussian distribution;
10/31	Chapter 14 & 15: Parameter Estimation for Random Vectors; Maximum Likelihood, Mean-Square Estimation, Regression Analysis, Orthogonality Principle; Central Limit Theorem
11/07	Statistics and Estimation: unbiased & consistent estimators, confidence intervals; Hypothesis Testing
11/14	Random Processes: Poisson, Random Telegraph Signals, Wiener and Markov Processes
11/21	Linear Systems with Random Inputs; Stationarity and Ergodicity Conditions, Power Spectral Density
11/28	Applications of Linear Systems & Random Processes
12/09	Course Review

**Quizzes & Exams:**

Quizzes every other week on material covered; Two in-class exams will be held during following weeks: Exam I : 10/11 Exam II: 11/14; Comprehensive Final Exam: Week of 12/12/2016

**Grading Policy**

In Class Quizzes      15%    Home Work and Computer Simulations      30%  
 Mid Term Exams      30%    Final Exam      25%