

ECE3720, Engineering Probability & Statistics, Spring 2017
Course Outline

1 Basic Probability and Statistics (4 lectures)

- 1.1 Objectives and Application Examples (L1)
- 1.2 Introduction to Statistics and Simulations (L1)
- 1.3 Random Experiments & Set Theory (L2)
- 1.4 Axioms of Probability (L2)
- 1.5 Probability Relationships (L3, L4)

2 A Single Random Variable (6 lectures)

- 2.1 Introduction: A Random Variable (RV) - Definition & Types (L5)
- 2.2 Probability Density Functions (pdf's) and Cumulative Distribution Functions (cdf's), w/ Examples (L5)
- 2.3 Examples of Continuous RV's (L6,7)
- 2.4 Examples of Discrete RV's (L8)
- 2.5 Transformation of a Random Variable (L9,10; $\leadsto$ T1)

3 Expectation & Moments of a Random Variable (3 lectures)

- 3.1 Expectation & The Mean of a RV (L12)
- 3.2 Expected Value of Functions of a RV - Moments (L12,13,14)
- 3.3 Computer Generation of Random Variables(L14)

***** Break *****

- 4 Multiple Random Variables (6 lectures)
 - 4.1 Joint pdf's and cdf's (L15,16)
 - 4.2 Marginal pdf's (L16)
 - 4.3 Conditional pdf's & Statistical Independence (L17)
 - 4.4 Expectation & Moments (L17,18)
 - 4.5 Joint Gaussian RV's (L19)
 - 4.6 Sums of Multiple RV's (L19,20)
- 5 Statistical Methods & Estimation (3 lectures)
 - 5.1 Introduction (L21)
 - 5.2 Mean and Variance Estimation (L21)
 - 5.3 Maximum Likelihood Estimation (L22)
 - 5.4 Sampling Distributions & Confidence Intervals (L23)
- 6 An Introduction to Random Processes (3 lecture)
 - 6.1 Introduction to Random Processes (L24)
 - 6.2 Wide-Sense Stationary Random Processes (L24,25)
 - 6.3 Linear Time-Invariant Systems (L26)
 - 6.4 Matched Filter (L26)