SYLLABUS

MATH 407 - Probability

Fall 2017
Prof. Baxendale

TEXT: A First Course in Probability (Ninth edition) by Sheldon Ross, published by Pearson Press.

CHAPTER 1: COMBINATORIAL ANALYSIS. Sections 1.1 to 1.5. Introduction. Basic rules for counting, permutations and combinations. Arrangements and assignments. (3 lectures)

CHAPTER 2: AXIOMS OF PROBABILITY. Sections 2.1 to 2.5. Sample spaces and events. Axioms for probability and their consequences. Sample spaces with equally likely outcomes. (3 lectures)

CHAPTER 3: CONDITIONAL PROBABILITY AND INDEPENDENCE. Sections 3.1 to 3.5. Conditional probabilities. Bayes' formula. Independent events. Repeated independent trials. (4 lectures)

CHAPTER 4: RANDOM VARIABLES. Sections 4.1 to 4.8, 4.10. Definition of random variable. Discrete random variables. Expectation and variance. Binomial, Poisson, and other families of random variables. The cumulative distribution function. (8 lectures)

CHAPTER 5: CONTINUOUS RANDOM VARIABLES. Sections 5.1 to 5.7. Probability density function. Expectation and variance of continuous random variables. Uniform, Normal and Exponential random variables. The distribution of a function of a random variable. (8 lectures) theorem.

CHAPTER 6: JOINTLY DISTRIBUTED RANDOM VARIABLES. Sections 6.1 to 6.5, 6.7. Joint distribution functions. Marginal distributions. Independent random variables. Distributions of sums of independent random variables. Conditional distributions. (6 lectures)

CHAPTER 7: PROPERTIES OF EXPECTATION. Sections 7.1, 7.2, 7.4 to 7.6 Expectation and variance of sums of random variables. Covariance and correlation. Conditional expectation. Prediction. (4 lectures)

CHAPTER 8: LIMIT THEOREMS. Sections 8.1 to 8.4. Chebyshev's inequality. Weak and strong laws of large numbers. Central limit theorem. (3 lectures)