MATH 3338: Probability
Course Outline

Prerequisites: MATH 1432: Calculus II

Text: Probability: The Science of Uncertainty with Applications to Investments, Insurance and Engineering, by Michael A. Bean, The American Mathematical Society, 2000.

Chapter and Section	**Suggested Exercises**
Chapter 1: Introduction	Read
Chapter 2: Basic Concepts Through Examples (2 weeks)	
2.1: Payoff in a Simple Game	
2.2: Choosing Between Payoffs	
2.3: Future Lifetimes	
2.4: Simple and Compound Growth	
2.6. Exercises	1, 3, 4-7, 9, 10, 13, 15-17, 20
Chapter 3: Classical Probability (2 weeks)	
3.1: The Formal Language of Probability	
3.2: Conditional Probability	
3.3: The Law of Total Probability	
3.4: Bayes' Theorem	
3.6: Exercises	1-4, 6, 7, 12, 13, 19, 20, 23
Chapter 4: Random Variables and Probability Distributions (3 weeks)	
4.1.1-4.1.11: Definitions and Basic Properties	
4.1.13: Exercises	2, 3, 5, 6, 8, 9, 11, 12, 14
4.2.1-4.2.3: Measures of Expectation, Variation and Risk	
4.2.4: Exercises	1-3, 5, 7, 8
4.3.1-4.3.2: Alternative Ways of Specifying Probability Distributions	
4.3.3: Exercises	1-3, 6, 8, 9

Chapter 5: Special Discrete Distributions (2 weeks)	
5.1: The Binomial Distributions	
5.2: The Poisson Distributions	
5.3: The Negative Binomial Distributions	
5.4: The Geometric Distributions	
5.5: Exercises	2, 4-6, 9, 11, 12
Chapter 6: Special Continuous Distributions (2 weeks)	
6.1: Continuous Distributions for Modeling Uncertain Sizes	
6.2: Continuous Distributions for Modeling Lifetimes	
6.3: Other Special Distributions (including normal)	
6.4: Exercises	1, 4, 6-8, 10, 17, 21, 22
Chapter 8: Sums and Products of Random Variables (2 weeks)	
8.1: Techniques for Calculating the Distribution of a Sum	
8.2: Distributions of Products and Quotients	
8.3: Expectations of Sums and Products	
8.5: The Central Limit Theorem	
8.7: Exercises	1, 4, 5, 7, 9, 19, 23