1. BASIC CONCEPTS 1.1 Introduction 1.2 Algebra of Events (Boolean Algebra) 1.3 Probability 1.4 Combinatorial Problems 1.5 Independence 1.6 Conditional Probability 1.7 Some Fallacies in Combinatorial Problems 1.8 Appendix: Stirling's Formula 2. RANDOM VARIABLES 2.1 Introduction 2.2 Definition of a Random Variable 2.3 Classification of Random Variables 2.4 Functions of a Random Variable 2.5 Properties of Distribution Functions 2.6 Joint Density Functions 2.7 Relationship Between Joint and Individual Densities; Independence of Random Variables 2.8 Functions of More Than One Random Variable 2.9 Some Discrete Examples **3.EXPECTATION** 3.1 Introduction 3.2 Terminology and Examples 3.3 Properties of Expectation 3.4 Correlation 3.5 The Method of Indicators 3.6 Some Properties of the Normal Distribution 3.7 Chebyshev's Inequality and the Weak Law of Large Numbers 4.CONDITIONAL PROBABILITY AND EXPECTATION 4.1 Introduction 4.2 Examples 4.3 Conditional Density Functions 4.4 Conditional Expectation 4.5 Appendix: The Generâl Concept of Conditional Expectation 5. CHARACTERISTIC FUNCTIONS 5.1 Introduction 5.2 Examples 5.3 Properties of Characteristic Functions 5.4 The Central Limit Theorem 6. INFINITE SEQUENCES OF RANDOM VARIABLES 6.1 Introduction 6.2 The Gambler's Ruin Problem 6.3 Combinatorial Approach to the Random Walk; the Reflection Principle 6.4 Generating Functions 6.5 The Poisson Random Process 6.6 The Strong Law of Large Numbers

7. MARKOV CHAINS7.1 Introduction7.2 Stopping Times and the Strong Markov Property7.3 Classification of States7.4 Limiting Probabilities

7.5 Stationary and Steady-State Distributions

8. INTRODUCTION TO STATISTICS

- 8.1 Statistical Decisions
- 8.2 Hypothesis Testing
- 8.3 Estimation
- 8.4 Sufficient Statistics
- 8.5 Unbiased Estimates Based on a Complete Sufficient Statistic
- 8.6 Sampling from a Normal Population
- 8.7 The Multidimensional Gaussian Distribution