

## Topics in Stat 609 (Fall Semester)

### Introduction

#### Chapters 1-3. Probability and Random Variable

1. Sample space and probability
2. Probability, conditional probability, and independence
3. Random variables, distributions, and transformations
4. Expectations
5. Moment generating functions
6. Characteristic functions and inequalities
7. Interchange integration and limit
8. Useful distributions
9. Exponential and location-scale families

#### Chapter 4. Multiple Random Variables

10. Joint and conditional distributions
11. Correlation and independence
12. Multivariate transformation
13. Noncentral chi-square, t-, and F-distributions
14. Multivariate mgf's and chf's
15. Multivariate normal distributions
16. Hierarchical models

#### Chapter 5. Properties of a Random Sample

17. Population, random sample, and statistics
18. Sampling distributions
19. Convergence
20. Multivariate convergence and the Central Limit Theorem
21. Convergence of transformations and generating a random variable

#### Chapter 6. Principles of Data Reduction

22. Sufficiency
23. Minimal sufficiency
24. Completeness

