STATISTICS 251 OUTLINE

(1) **Week 1**
   (a) Discrete Probability Spaces
   (b) Counting Principles
   (c) Conditional Probability & Bayes Rule

(2) **Week 2**
   (a) Binomial Distribution
   (b) Sampling with and without replacement
   (c) Poisson Approximation to Binomial Distribution

(3) **Week 3**
   (a) Random Variables
   (b) Discrete Distributions
   (c) Expectation
   (d) Variance & Standard Deviation
   (e) Independence

(4) **Week 4**
   (a) Chebyshev and Markov Inequalities
   (b) Normal Approximation (CLT): Statement & Applications
   (c) Stirling's Formula & Normal Approximation to Binomial

(5) **Week 5**
   (a) Continuous Random Variables
   (b) Probability Densities
   (c) Expectation & Variance for Continuous RVs
   (d) Uniform Distribution & Bernoulli RVs
   (e) **Midterm Exam Thursday May 1 7:00–9:00 p.m.**

(6) **Week 6**
   (a) Exponential & Gamma Distributions
   (b) Poisson Processes
   (c) Order Statistics

(7) **Week 7**
   (a) Transformations & Change of Variables
   (b) Quantile Transform Method of Simulation
   (c) Acceptance/Rejection Method of Simulation
   (d) Independence & Joint Densities

(8) **Week 8**
   (a) Joint Distributions & Multivariate Densities
   (b) Independent Gaussian Random Variables
   (c) Transformations & Jacobians
   (d) Chi-Square Distribution

(9) **Week 9**
   (a) Dependence
   (b) Conditional Distributions & Densities
   (c) Covariance & Correlation
   (d) Bivariate Normal Distribution

(10) **Week 10**
    (a) Simple Random Walk & Gambler's Ruin