I. Chapter 1: Foundations of Probability Theory
   A. Axioms (page 5)
   B. Classical (discrete) probability model
   C. Geometric probability model
   D. Some consequences of the axioms
   E. Stirling’s approximation

II. Chapter 2: Conditional Probability
   A. Definition
   B. Chain rule
   C. Independent events
   D. Tree diagrams . . .
      1. . . and the rule of conditional probability
      2. . . and Bayes’ formula
      3. . . and Bayesian inference

III. Chapter 3: Discrete Random Variables
   A. What’s a “random variable”?
   B. Expected value
      1. Expected value of sum
      2. Variance
   C. Independence of random variables
   D. Some famous (important) distributions
      1. Uniform on $\mathbb{Z} \cap [a, b]$
      2. Bernoulli, parameter $p$
      3. Binomial, parameters $n$ and $p$
      4. Geometric, parameter $p$
      5. Poisson, parameter $\lambda$
      6. Hypergeometric

IV. Chapter 4: Continuous Random Variables
A. Probability density functions
B. Expected value and variance
C. Some famous (important) continuous random variables
   1. Uniform on \([a, b]\)
   2. Exponential, parameter \(\lambda\)
      a. Comparison to Geometric
      b. Memoryless property
      c. \(\min(X, Y)\) is also exponential
   3. Erlang, parameters \(n\) and \(\lambda\)
   4. Normal, parameters \(\mu, \sigma\)
      a. Standard normal distribution
      b. First pass at Central Limit Theorem
D. Simulation (not covered on Test 2)
E. Failure rate; entropy (not covered on Test 2)
V. Chapter 5: Jointly Distributed Random Variables
   A. Marginal distributions
   B. Independence of random variables
VI. Chapter 6: Multivariate Normal Distributions
VII. Chapter 7: Conditioning by Random Variables
VIII. Chapter 8: Generating Functions
IX. More on Laws of Large Numbers (Section 9.2)