Chapter 14, 15:

- Terminology: **experiment, sample space, outcome, event, disjoint, independent, law of large numbers**
- A probability is between 0 and 1 always!
  - If you have disjoint events and add up their probabilities, the sum cannot be greater than 1
  - The sum of probabilities for all outcomes in the sample space = 1
  - Probability of 1 means it is a "sure event"
  - probability of 0 means it is an "impossible event"
- How to draw a Venn Diagram
- Answering probability questions
- How to calculate probability from a table
- "Or" is a union (∪), "And" is an intersection (∩).
- **Probability Rules**:
  - Complement Rule
  - Addition Rule (for disjoint events)
  - General Addition Rule, aka Inclusion-Exclusion Rule (no assumption about disjoint)
  - De Morgan's Rule
  - Multiplication Rule (for independent events)
  - General Multiplication Rule: $P(A \cap B) = P(A) * P(B \mid A)$ (no assumption about independence)
- Probability of a union of events is the sum of the probabilities ONLY if the events are disjoint
  - e.g. Probability of rolling a 2 or 3 with a 6-sided die is $P(2 \cup 3) = P(2) + P(3)$ because rolling a 2 and rolling a 3 are disjoint
  - e.g. Probability of rolling a number greater than 3 or rolling an even is not P(number>3) + P(even number) because these are not disjoint events – rolling a 4 or 6 is an outcome in both events
- Don't assume two events are disjoint (i.e. don't assume the probability of the intersection is zero)
- Probability of an intersection of events is the product of the probabilities ONLY if the events are independent.
- When is it a reasonable assumption that two events are independent?
- Conditional Probability – what it means
  - P(A|B) is only defined if P(B)>0 ! You can't divide by zero EVER!
- Test for independence based on a Table
- Get marginal distribution from a table
- Bayes Theorem (it's a monster of a formula, but really good to remember it!)
- Tree Diagrams