I. **Sections to Read** (All content from Blitzstein and Hwang's *Introduction to Probability* unless otherwise noted)

- Read sections 2.1 - 2.4

II. **Videos to Watch** (All videos from Blitzstein's Math 110 YouTube channel, unless otherwise noted)

- Lecture 4: Conditional Probability (Just from 30:00 onward)

III. **Objectives**

- State the set-theoretic definition of conditional probability and explain what the conditional probability of an event means in 'everyday language'
- Express particular experiments as probability models using conditional probability
- Use Bayes' Law and the Law of Total Probability in order to compute probabilities in a wide variety of problems.

IV. **Quiz Questions** (Submit answers on Gradescope)

1) Suppose a coin is flipped 3 times and the sequence of H/T recorded. Let A be the event that the first flip is heads, and let B be the event that exactly 2 tails are flipped. Compute $P(A|B)$ and $P(B|A)$. *You can assume all sequences of H/T are equally likely.*
2) Let S be a sample space, and let A, B, C be events. Simplify the following ratio:

$$\frac{P(A)P(B|A)P(C|A,B)}{P(C)P(B|C)P(A|B,C)}$$

3) Describe one reason why we may use Bayes' Theorem to calculate a conditional probability.
4) Briefly explain what is meant by the statement 'all conditional probabilities are probabilities.'