I. **Pre-class material** Either read the indicated textbook sections OR watch the indicated video.

(a) **Sections to Read** (All content from Blitzstein and Hwang's *Introduction to Probability* unless otherwise noted). A digital copy of the textbook is available for free via the authors' website.

- 9.2, 9.3
- Skim 9.4

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

- Lecture 26: Conditional Expectation Continued (from 29:00 to end)
- Lecture 27: Conditional Expectation given a an R.V (from beginning to 30:00)

II. **Objectives** (By the end of the day's class, students should be able to do the following:)

- Use properties of conditional expectation to compute the conditional expectation of a variable given another in a variety of situations.
- State and prove Adam's Law.
- Distinguish between conditional expectation given an event, and conditional expectation given a random variable.

III. **Reflection Questions** (Submit answers on Gradescope `https://www.gradescope.com/courses/425901`)

1) Let X and Y be discrete random variables. Describe at least one key difference between the expressions $E[Y|X = x]$ and $E[Y|X]$.
2) Suppose X and Y are random variables. Under what circumstances is $E[X|Y] = X$? Under what circumstances is $E[X|Y] = E[X]$?
3) Suppose X and Y are random variables (not necessarily independent). In your own words, explain how conditional expectation allows us to decompose Y into a sum of two variables, one of which is a function of X and the other which is uncorrelated with X.

IV. **Additional Feedback** Are there any topics you would like further clarification about? Do you have any additional questions based on the readings / videos? *If not, you may leave this section blank.*