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.

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

- Lecture 25: Order Statistics and Conditional Expectation (44:00 through end)
- Lecture 26: Conditional Expectation (beginning through 29:00)

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

- State the definition of conditional expectation given an event.
- Apply the Law of Total Expectation to compute expected values.
- Resolve the 2 envelope paradox.

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

1) Suppose X is a random variable and let $Y = X^3$. Evaluate $E[Y|X = 2]$. Does your answer agree with your intuition?
2) Suppose X and Y are independent **discrete** random variables with $E[Y] = \mu$, and let x be a value in the support of X. Evaluate $E[Y|X = x]$ using the definition of conditional expectation. Does the answer depend on x?
3) In your own words, explain what the Law of Total Expectation means. Limit your answer to 2 - 3 sentences.

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.*