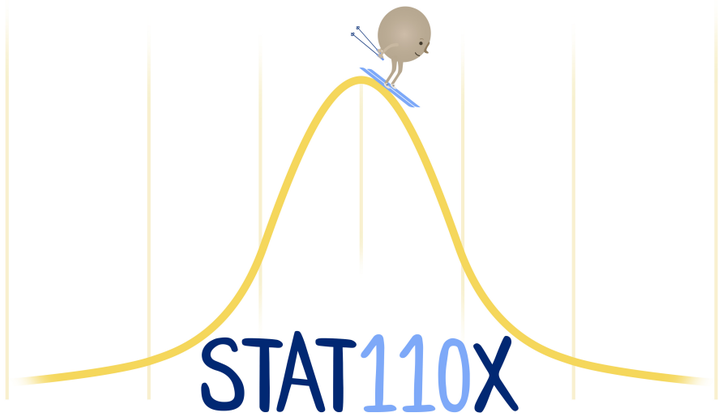

STAT110x: Introduction to Probability

A comprehensive introduction to probability as a language and toolbox for understanding statistics, science, risk, and randomness.

The world is replete with randomness and uncertainty; probability and statistics extends logic into this realm. In this course, you will learn ideas and tools needed to understand the data and randomness that arise in many areas of science, engineering, economics, and finance.

This course aims to provide a strong foundation for future study of statistical inference, stochastic processes, machine learning, randomized algorithms, econometrics, and other subjects where probability is needed.

Prerequisites: All units require knowledge of algebra; Units 4-6 require single variable calculus (derivatives and integrals); Unit 7 requires familiarity with matrices. No previous background in probability or statistics is required.

What You'll Learn

- How to use probability to think about randomness and uncertainty
- The story approach to understanding random variables
- Probability distributions that are widely used in statistics and data science
- How to make good predictions and think conditionally
- Problem solving strategies

Course Material and Schedule

This course has seven units of content, after a short introduction and orientation:

Two units will be released each week, until all units are online. A course map is available to help navigate the material.

- Unit 0: Introduction and Course Orientation (Released July 19, 2018)
- Unit 1: Probability, Counting, and Story Proofs (Released July 19, 2018)
- Unit 2: Conditional Probability and Bayes' Rule (Released July 19, 2018)
- Unit 3: Discrete Random Variables (Released July 26, 2018)
- Unit 4: Continuous Random Variables (Released July 26, 2018)
- Unit 5: Averages, Law of Large Numbers, and Central Limit Theorem (Released August 2, 2018)
- Unit 6: Joint Distributions and Conditional Expectation (Released August 2, 2018)
- Unit 7: Markov Chains (Released August 9, 2018)

The course will end January 18, 2019. After the course ends, the content will remain available in archive mode. The discussion forums will close to new posts, but past posts will be read-only, and the staff will no longer be monitoring the course.

The course team will send out occasional emails when new content is released, reminders closer to the course close, and for other occasional announcements. The messages will be archived under the course updates.

Assessments and Grading

> **The pass rate for this course is 60%. All work is due at the end of the course.**
>
> Each unit has both practice problems and homework problems. The practice problems are worth 30% of your grade and the homework problems are worth 70%.
>
> The practice problems are provided to help you practice with the concepts before tackling the homework problems. They are graded on completion, not correctness. Use the show answer feature within the problems to see a detailed solution. In contrast, the homework problems are graded on correctness.

Course Policies

This course is governed by the following policies. Be sure to read them carefully.

HarvardX Honor Code

HarvardX requires individuals who enroll in its courses on edX to abide by the terms of the edX honor code. HarvardX will take appropriate corrective action in response to violations of the edX honor code, which may include dismissal from the HarvardX course; revocation of any certificates received for the HarvardX course; or other remedies as circumstances warrant. No refunds will be issued in the case of corrective action for such violations. Enrollees who are taking HarvardX courses as part of another program will also be governed by the academic policies of those programs.

HarvardX Nondiscrimination/Anti-Harassment Statement

Harvard University and HarvardX are committed to maintaining a safe and healthy educational and work environment in which no member of the community is excluded from participation in, denied the benefits of, or subjected to discrimination or harassment in our program. All members of the HarvardX community are expected to abide by Harvard policies on nondiscrimination, including sexual harassment, and the edX Terms of Service. If you have any questions or concerns, please contact harvardx@harvard.edu and/or report your experience through the edX contact form.

HarvardX Research Statement

HarvardX pursues the science of learning. By registering as an online learner in an HX course, you will also participate in research about learning. Read our research statement to learn more.

Discussion Forum Posting Policy

We encourage class participants to share their solutions and ideas for **practice** problems, whereas for **homework** problems, posting full solutions in the forums is not allowed. The staff will be proactive in removing posts and replies in the discussion forums that have stepped over the line.

- It is ok to discuss the general approach to solving a homework problem, without going into a lot of technical details.
- It is ok to ask for a hint, or several hints for that matter, if you get stuck while solving a homework problem. When asking for a hint, try to explain in general terms what you have tried and why you are stuck.
- It is **NOT OK** to take someone else's solution and simply copy the answers from their solution into your problem.
- It is **NOT OK** to take someone else's formula and plug in your own numbers to get the answer for any problem.
- It is **NOT OK** to post answers to any problem.
- It is **NOT OK** to look at someone else's full, step-by-step solution to any homework problem.

If you have collaborated with others in generating a correct solution to a problem, a good test to see if you were engaged in acceptable collaboration is to make sure that you are able to do the problem on your own.

> ☣ **Warning on Homework Problems.**
>
> We will have a separate forum each week to keep homework problem discussion separate from discussion of practice problems and the course material.

Discussion Forum Guidelines

The discussion forum is the main way for you to communicate with the course team and other students. We hope it contributes to a sense of community and serves as a useful resource for your learning. Here are some guidelines to observe on the forums.

- **Search Before Asking:** The forum will be hard to use if there are multiple threads on the same issue. The best discussions happen when several people participate in a single thread. Before asking a question, use the search feature to see if someone else has already created this thread.
- **Descriptive Titles:** Try to compose a title which is descriptive and provides as much information as possible without being overly long: In your title, specify the problem or video and, in a few words, what your issue is. In the question text, describe what aspect you do not understand and what you have already tried doing.
- **Organize your Discussions:** When creating a post, be sure to choose a category (such as General, Tech Issues, or Python Help). If you have a question about a particular page or problem, include a link to that page.
- **Write Clearly:** We know that English is a second language for many of you but correct grammar will help others to respond. Avoid ALL CAPS, abbrv of wrds (abbreviating words), and excessive punctuation!!!!
- **Encourage useful posts:** This applies to both questions and responses. Click on the green plus button at the top right of the box for either a post or a response. In this way, useful posts can be found more easily.
- **Be polite:** We have learners from all around the world and with different backgrounds. Something that is easy for you may be challenging for someone else. Let's build an encouraging community.
- You can create mathematical expressions in the forums by encasing LaTeX code in dollar signs.

Course staff can be contacted on the discussion forum by creating a new post with the word [STAFF] in the title. Issues will generally be addressed within 72 hours.

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