Math 8a: Introduction to Probability and Statistics
Summer 2018

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Textbooks:
   Statistics (4th edition), by David Freedman et al.

Course Description: In this course (MATH 8a), you will learn the principles of statistics, a branch of mathematics that will enable you to design effctive experiments, analyze the resulting data, and extract conclusions about the real world. Data always have a story to tell - statistics is the key to unlocking that story. Here are a few of the questions statistics aims to answer:

- Is there a gender bias in college admissions?

- Does smoking cause lung cancer?

- Are Brandeis undergraduates taller than the general population?

The second portion of this course is an introduction to probability, the branch of mathematics that models uncertainty and chance. Basic questions that we will address include:

- Why is 7 the most common roll of two dice?

- What is the chance that a patient has a disease if a certain blood test returned positive?

- In the game of poker, should a straight beat a flush?

Learning Goals: Students will be able to:

- Use statistical measurements to summarize a set of data.

- Criticize a flawed data analysis.

- Interpret correlation coefficients in a linear regression.

- Distinguish correlation and causation.

- Recognize the salient vocabulary of probability and statistics.

- Answer basic questions of probability about dice and cards.

Course Outline: The course follows the textbook closely, omitting chapters 15, 22, 25, and 28. Here is a rough outline:

Textbook chapters	Description
Ch. 1, 2	Design of Experiments
Ch. 3, 4, 5, 6	Descriptive Statistics
Ch. 7, 8, 9, 10, 11, 12	Regression and Correlation
Ch. 13, 14	Probability
Ch. 16, 17, 18	Long-run Expectation
Ch. 19, 20, 21, 23	Sampling
Ch. 24	Gauss Model
Ch. 26, 27, 29	Tests of Signicance

Assessment: You will be tested through a variety of media: homework, quizzes, tests. Homework assignments and deadlines can be found on LATTE. Feel free to collaborate with peers on your homework, but you should write them by your own words. Other media will be solo. You are highly encouraged to ask me whenever you have questions about the course material. Please do not hesitate to ask for an appointment.

Category	Weight	Notes
Attendance:	5%	
Homework:	30%	Assignments are on LATTE.
Quizzes:	20%	There will be three quizzes in class. Dates: June 11, 18 and 28
Midterm Exam:	20%	Date: June 21 in-class
Final Exam :	25%	TBD

Pre-requisite: There are no course pre-requisites. I assume that you know high school level algebra, and are familiar with plotting points and graphing functions. Although knowing Calculus might be helpful, I will not assume that you know any Calculus for this course.

Calculators: On homework, quizzes, and exams, you are allowed a basic calculator (all that you will need are $+, -, \times, \div$ and square roots). You may not use your phone.

Disability Accommodation: If you are a student who needs academic accommodations because of a documented disability, please contact me and present your letter of accommodation as soon as possible.

Academic Integrity: You are expected to be familiar with and to follow the University's policies on academic integrity (see brandeis.edu/studentlife/sdc/ai). I will report any instances of alleged dishonesty to the Office of Student Development and Conduct. Repercussions may include failing the course or suspension from Brandeis. Please ask me for any clarication.