15.075: Statistical Thinking and Data Analysis
Spring 2019

Instructor: Mohammad Fazel-Zarandi
Office: E62-560

Classes meet:
Section A: Mon/Weds, 10:00-11:30 in E51-395
Section B: Mon/Weds, 11:30-1:00 in E51-395

Instructor’s Office hours: TBD

Teaching Assistant: Hussein Hazimeh (hazimeh@mit.edu)

Recitations Meet:
Section A: Fri, 2:00-3:00 in E52-164
Section B: Fri, 3:00-4:00 in E52-164

TA’s Office Hours: TBD

COURSE OVERVIEW:
This course develops ideas for making decisions based on data. Some of the following material will be covered: data displays and summary statistics for quantitative and qualitative data; analysis of frequency tables of qualitative data; probability as idealized long-run proportions; the law of large numbers for means and empirical histograms; the normal distribution and the central limit theorem; statistical inference based on standard errors, confidence intervals; statistical hypothesis tests for the sample mean and differences between sample means; correlation and simple regression for quantitative data; multiple regression with quantitative data; logistic regression for binary data.

The course does not dwell on the details of computation—its main focus is on understanding a few deep concepts and interpreting data and the results of statistical analysis.

COURSE MATERIALS:

- Software: R (download here: https://cran.r-project.org/). R is by far the most commonly used open source software for applied statistical analyses. There are thousands of contributed functions/packages available that are ready to use. Some of the core statistical concepts will be illustrated with numerical examples in R. We will not assume that students are familiar with R.
- Class notes will be posted on an ongoing basis.
• **Recommended Textbooks.** Although not required, students may find either of the following books useful as a complement to the lecture material.

1. “Statistics for Business: Decision Making and Analysis” by Robert A. Stine and Dean P. Foster

**GRADING:**

• Your course grade will be calculated as 25% homework, 30% midterm, and 45% final exam.

• Participation in class, the online discussion forum, as well as office hour and recitation attendance will also figure into the final grade as follows: students who contribute exceptionally in at least one of these ways may experience a rise of their grade by one step (e.g., from B- to B) at the instructor’s discretion.