STA 130S: An Introduction to Statistical Reasoning and Data Science (Winter 2016)

[See also the evolving lecture notes (in various formats), to be updated after each lecture.]

This course, intended for students considering a program in Statistical Sciences, discusses the crucial role played by statistical reasoning in solving challenging problems from natural science, social science, technology, health care, and public policy, using a combination of logical thinking, mathematics, computer simulation, and oral and written discussion and analysis.

Instructor: Professor Jeffrey Rosenthal, Department of Statistics, University of Toronto. Sidney Smith Hall, room 5016B; phone (416) 978-4594; http://probability.ca/jeff/; j.rosenthal@math.toronto.edu

Time: Mondays and Wednesdays, 2:10 - 4:00 p.m. First class Jan 11. Last class Apr 6. No class Feb 15 & 17 (Reading Week).

Course Web Page: Visit www.probability.ca/sta130 for course information and lecture notes.

Lectures: Mondays (and Wed Jan 13), 2:10 - 4:00 p.m., in room 220 of the Galbraith Building (building "GB" on campus map).

Tutorials: Wednesdays (Jan 20 onwards), 2:10 - 4:00 p.m. Your tutorial location and your TA will be announced on the Blackboard Grade Centre (by Jan 18), and will be one of:
LM157 -- Natasha Gray (Public Health MSc, natasha.gray@mail.utoronto.ca)
WE76 -- Maelle Marchand (Epidemiology MSc, maelle.marchand@mail.utoronto.ca)
SS621 -- Jason Rajsic (Psychology PhD, jason.rajsic@mail.utoronto.ca)
IN209 -- Thivviya Vairamuthu (Anthropology MSc, thivviya.vairamuthu@mail.utoronto.ca)
LM123 -- Nora Zwingerman (Public Health PhD, nora.zwingerman@mail.utoronto.ca)
Note: Your assigned tutorial on the Blackboard Grade Centre will include a room, together with a group label in brackets. For example, if it says "WE76(c)", that means your tutorial is in room 76 of Westmore Hall (building "WE" on campus map), and your group label is "c".

Office Hours: The instructor and TAs will all be available after every class, so please come talk to us! We will also be arranging regular office hours, plus additional office hours before the test and exam. You can also e-mail us to ask questions or arrange one-on-one meetings (for best results, put "STA130" in the subject line).

Corequisite: MAT136H1 / MAT137Y1 / MAT157Y1.

Exclusion: Any of STA220H1/STA255H1/STA248H1/STA261H1/ECO220Y1/ECO227Y1 taken previously or concurrently.

Evaluation [tentative]:
Midterm 20% (2:10-4:00 on Wed Feb 24 in EX320);
Final Exam 40% (three hours; some time during April 12-29);
Quizzes (in tutorials) 10%;
Oral participation during tutorials 10%;
Computer homework 7%; [HW#1 due Jan 27 at 2:10pm]
Professional report 8% (probably due in March);
External participation 5% (attending mentorship meetings and events; to be explained on Jan 27).

Communication: This course will require students to **communicate** well in both written and spoken English, including written answers on the quizzes/test/exam, and oral discussions and presentations in tutorials. Students desiring help may wish to avail themselves of the resources available at: http://www.writing.utoronto.ca/ and http://www.writing.utoronto.ca/writing-centres/arts-and-science and http://www.artsci.utoronto.ca/current/advising/ell

Computing: Students will be required to do some homework assignments using a computer running the statistical software package "R", which is available to download for free onto any computer or to use in campus labs; see probability.ca/Rinfo.html for more information.

Calculators: On the test and exam and **some** quizzes, you will be permitted to use a simple (non-programmable, non-graphing, non-cell-phone) **calculator**, so please obtain one. (Don't worry, they're cheap.)

Further Reading: There is no formal textbook for this course. However, for extra reading beyond the lecture notes, there are many traditional textbooks that cover most of the material in the course (though perhaps in a different way), such as:

- *Introduction to the Practice of Statistics*, by David S. Moore and George P. McCabe. (Any edition will do.)
- *Stats: Data and Models, Canadian edition*, by Richard D. De Veaux, Paul F. Velleman, David E. Bock, Augustin M. Vukov, and Augustine C.M. Wong.
- *Statistics*, by David Freedman, Robert Pisani, and Roger Purves.

There are also many free textbooks and other information available online, such as:

- OpenIntro Statistics, by David M. Diez, Christopher D. Barr, and Mine Cetinkaya-Rundel
- Online Statistics Education, by David M. Lane, David Scott, Mikki Hebi, Rudy Guerra, Dan Osherson, and Heidi Zimmer
- HyperStat Online, by David M. Lane
- StatPrimer, by B. Burt Gerstman
- Khan Academy: Probability and Statistics

Lateness policy: Homeworks are due at 2:10pm **sharp**. Lateness penalties are: 1-10 mins = 1 point; 11-30 mins = 2 points; 31-90 mins = 3 points; 91 mins - 24 hours = 4 points; longer = homework not accepted.

Regrading policy: Regrading requests should only be made for **genuine grading errors**, and should be initiated by writing or typing a complete explanation of your concern (together with your full name, student number, e-mail address, and telephone number) on a **separate piece of paper**, and giving this together with your original **unaltered** quiz/homework/test paper **to the professor** within one week of when the graded homework or test was first available. **Warning: your mark may end up going down rather than up.** (Note: for the final exam, a different Faculty-wide process is followed.)

This document is available at www.probability.ca/sta130 or permanently at www.probability.ca/jeff/teaching/1516/sta130/