STA 257F: Probability and Statistics I, Fall 2024

This course will present an introduction to mathematical probability theory, including: probability spaces, common probability distributions, discrete and continuous random variables, distribution and density functions, joint distributions, expected values, generating functions, probabilistic inequalities, convergence of random variables, laws of large numbers, the Central Limit Theorem, and the concept of statistical inference. See also the evolving **lecture notes**, to be updated the evening **after** each lecture.

Course Web Page Quick link: probability.ca/sta257

Course Enquiries email address: sta257@course.utoronto.ca   (Or, for enrolment issues: ug.statistics@utoronto.ca.)

Instructor: Professor Jeffrey S. Rosenthal, Department of Statistics, University of Toronto. Email j.rosenthal@math.toronto.edu; web http://probability.ca/jsr

Lectures -- Mondays (2 hours) and Wednesdays (1 hours):
First class Sept 4. Last class Dec 2. No class Oct 14 (Thanksgiving) nor Oct 28 nor 30 (Reading Week).
Lectures will be **interactive**; please **stop talking** and **pay close attention** to the material being presented, and **raise your hand** to ask and respond to questions, and participate in **polls** (info below).

Tutorials -- Wednesdays (1 hour, right after lecture):
First tutorial **Sept 11**. Last tutorial Nov 27. No tutorial Oct 9 (Midterm #1) nor Oct 30 (Reading Week) nor Nov 13 (Midterm #2).
Tutorials will discuss solutions to each week's **suggested homework problems**.
TAs will also have some time for **office hours**, and to reply to **email** and **Piazza** questions.
See also the New College Stat Aid Centre (scroll down).

Textbook: We will roughly follow the book Probability and Statistics: The Science of Uncertainty (2nd ed) by M.J. Evans and J.S. Rosenthal, available as a **free pdf file of the entire book**, specifically the **first four chapters**:
• **Chapter 1 (Probability Models, pp. 1-32)**,
• **Chapter 2 (Random Variables and Distributions, pp. 33-128)**,
• **Chapter 3 (Expectation, pp. 129-198)**,
• **Chapter 4 (Sampling Distributions and Limits, pp. 199-252)**
• See also the **TOC** and **preface** and **background** and **index** and **answers** and **solutions manual**. **[NEW: errata.]**
Note: Please try to save these pdf files **locally** on your computer, rather than download them every time.
[Much of this material is also covered in Chapters 1-4 of this book, with solutions at this link: search ISBN 978-3-319-52401-6, then "product archive file".]
[The follow-up course STA261 then covers much of the material in the later chapters, and STA347/STA447/book expand on probability and Chapter 11.]

Prerequisites: MAT137 or 157 (or their UTSc/UTM equivalents), plus co-requisites MAT237 / 257 and MAT223 / 240. Strictly enforced by the university! (There are lower math prerequisites in STA237 and 247.)
Send enquiries about this to: ug.statistics@utoronto.ca

Instructor Office Hours: Monday lectures will end a bit early, and the instructor will **stay for questions**. He will also have **office hours on Wednesdays 2:10-2:45** in **MyHal 430** during term time (but **not** on midterm days). You can also email the instructor to ask questions or arrange to meet. **Special additional office hours** will be arranged before the midterms and exam and as needed, including: **Tuesday Oct 8 from 3:15-4:30 in MS 3278**, and **Tuesday Nov 12 from 11:15-12:30 in HA 401.**

Discussion Page: There will be a STA257 "Piazza" discussion page where students can post and answer questions about the course. You should be able to access it from the course's quercus page; let me know of any difficulties. Also, feel free to create a recognized study group, or join a drop-in study space or learning community or international support [reg].

Homework: There will be **suggested homework** exercises assigned from the textbook each week, listed within the course notes. They will **not** be handed in or graded, but they will be discussed in tutorial, and are **strongly recommended** to learn the material well. (See also the book's selected answers and solutions; send corrections to sta257@course.utoronto.ca.) We will mostly skip the textbook's Challenges and Discussion Topics, but you are encouraged to think about them too.

Statistical Computing: This course will **not** require students to perform statistical computations. However, the statistical package "R" will be demonstrated in lecture, and students are encouraged to try it on their own; see this basic R information or textbook Appendix B.

Evaluation:
• **27%** Midterm #1: **Wed Oct 9**, at **11:10-1:00 for L0101 in EX320**, or **3:10-5:00 for L0201 in EX100**; 100 mins.
• **27%** Midterm #2: **Wed Nov 13**, at **11:10-1:00 for L0101 in EX100**, or **3:10-5:00 for L0201 in EX100**; 100 mins.
• **41%** Final Exam: to be scheduled during Dec 6-23; three hours.
• **5%** Class poll participation; see poll registration and information here.

All tests will be **closed book** (no aid sheet), and will cover **all material in lecture up to that point** (though Midterm #2 will emphasise material since Midterm #1). Yes including **proofs**.
Bring your TCard. Do **NOT** sit next to anyone that you **know**. You may bring one basic calculator for arithmetic only.
You must take the midterm of the section that you are enrolled in, or 20% penalty. Write with **pen or sharp pencil** in the **space provided** (or last page).
You are required to follow the university's Code of Behaviour at all times. Thank you for **not cheating!**
Any student who **cannot attend** a midterm due to illness should submit an ACORN Absence Declaration (or for multiple absences a Verification of Illness form), and send the information to sta257@course.utoronto.ca. If excused, the corresponding weight will be shifted to the Final Exam. If a student cannot attend the Final Exam, they should instead submit a petition for a deferred exam.

Regrades: Regrading requests should be made **within one week** of when the graded item was first available, but only for **genuine grading errors**, not for grading **judgements**, otherwise **your mark may end up going down** rather than up. For details, see the regrading policy and instructions. (For the **final exam**, a different Faculty-wide process should be followed instead.)

Stressed? If you encounter challenges during your studies, then please see these support options or here or visit Learning Support or the Health & Wellness Centre or Navi for assistance and support.

This document is available at probability.ca/sta257, or permanently at probability.ca/jeff/teaching/2425/sta257/.