STA 248 L0101 - Statistics for Computer Scientists
T 10-12, R 11-12 in ES 1050 & MC 102

Instructor: Karen H. Wong - karen.huynhwong@utoronto.ca

Office Hours: HS 386 (155 College St.) - T: 3:30-4:30 PM & R: 3:45-4:45 PM

TA Office Hours will be posted on Quercus

Textbook: *Modern Mathematical Statistics with Applications*, 2nd ed. available through the library here and *OpenIntro Statistics*, 4th ed. which can be found here. Independent reading and practice will also be assigned from R for Data Science.

Calculators: Only non-programmable calculators are permitted (for more information, see this list on Casio for comparison).

Course Website: All lecture slides, assignments, problem sets, course information will be posted on Quercus. Course materials provided on Quercus are for the use of students currently enrolled in this course only. Providing course materials to anyone outside of the course is unauthorized use.

Course Description: A survey of statistical methodology with emphasis on data analysis and applications. The topics covered include descriptive statistics, data collection and the design of experiments, univariate and multivariate design, tests of significance and confidence intervals, power, multiple regression and the analysis of variance, and count data. Students learn to use a statistical computer package as part of the course (Note: STA248H1 does not count as a distribution requirement course).

Prerequisites: STA247H1/STA257H1; CSC108H1/CSC148H1

Exclusions: ECO220Y1/ECO227H1GGR270Y11/PSY201H1/SOC202H1/SOC300Y1/STA220H1 STA221H1/STA250H1/STA255H1/STA261H1/EEB225H1

Grading: There will be multiple evaluations in the form of assignments, midterms, and graded activities. The grade breakdown is as follows:

Syllabus Treasure Hunt	1%	Due: Jan. 23
Assignments	10% each	Due: Feb. 14, Apr. 2
In-Class Activity	5%	Feb. 27
Midterm	30%	Mar. 3 at 10 AM - 12 PM, location TBD
Final Exam	44%	TBD

Assignments: All assignments are individual assessments (i.e. all work is yours alone, with perhaps reference to course materials). Students are to complete assignments independently, to the best of their understanding of the questions. Only select problems on the assignments will be evaluated.

Assignments will be submitted through Crowdmark on Quercus. Official due dates will be posted on the assignment PDF. Late assignments will receive a penalty of 5% for every hour interval that the assignment is late. For example, if an assignment is submitted 10 minutes after the due date, there would be a penalty of 5% on the assignment grade (i.e. 90% $\rightarrow$ 85%).

Grading Policy: Any answers on assignments, midterms, and final exam without justification and showing your work **will not receive any credit**, regardless of the "correctness" of the answer. All graded work is an opportunity for you to demonstrate, beyond a shadow of a doubt, that you have sufficiently learned and understood course concepts. This includes **defining variables/random variables, distributions, relevant parameters, providing brief explanations, etc.** as necessary.

All assignments, midterms, and final exam will be graded according to a comprehensive marking scheme. If after reviewing posted marking schemes you believe you have earned more credit than what was awarded, send me an email with a brief explanation **no later than 1 week after the assessments have been released back to you**. **If you require an extension for an assignment with valid reasons and documentation, please notify me prior to the due date** to have something arranged.

Homework: Suggested practice problems from the textbook and exercises will be provided in the lecture slides for each topic covered. It is strongly recommend that you attempt as many as possible with **and without notes** to assess your own understanding of concepts.

Extra Help: Regular office hours will be offered along with extra hours before the midterm and final exam. These will posted on Quercus under *course help*. If you are experiencing difficulty with course content, or have questions related to course material, please come by during the available office hours. TA office hours are located in HS 381. There is an additional aid centre in New College Wetmore 68A(see schedules). If you are experiencing difficulty with course content, or have questions related to course material, please attend the available office hours.

We will be using Piazza for discussion of practice problems and general course concepts. In lieu of emailing, you are encouraged to post your course questions and work on Piazza. Please note that **assignments are individual assessments** and assignment questions are **not to be posted publicly** on Piazza. If you have any problems or feedback for the developers, email team@piazza.com. Find our class page here. Use of Piazza is **entirely optional** and students who choose to use it should read the Privacy Policy agreement and post only what they are comfortable sharing as stated in the agreement.

Course Conduct:

- **Email:** Any administrative questions regarding the course should be addressed to the course instructor (karen.huynhwong@utoronto.ca). Questions regarding course material and concepts should be addressed in office hours and not via email. If those times do not work for you, separate hours can be set up by appointment.
- **During Lecture:** Please practice classroom etiquette – arrive on time, put your devices on silent, hold your conversations for later, and most of all, be respectful of your peers. If you anticipate that you will have to leave early for any reason, please seat yourself so that you may do so without disrupting your fellow peers.

- **Programming Languages:** In this course, we will occasionally be using R statistical software which is available for free download. Any code required for assignments will be provided either in lecture or easily found using a search engine. **You will not be tested on coding** however you will be expected to read and understand R output on any assessments.

- **Missed Tests:** There are no make-up tests. Any missed tests that are a result of illness requires a **U of T Student Medical Certificate** to be completed by you and your doctor within one week of the test. This can be obtained from your college registrar, the Office of the Faculty Registrar (SS1006), the Statistics Department office, or the Koffler health service. The weight of the missed term test will be shifted to the final exam. A missed test without proper documentation will receive a mark of zero.

Accessibility Services:: The University of Toronto provides accommodations through accessibility services to students with diverse learning styles and needs. If you have a disability or health consideration that may require accommodations, please feel free to reach out to me and/or Accessibility Services at 416-978-8060 or through accessibility.utoronto.ca.

Academic Integrity: Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that the U of T degree that you earn will be valued as a true indication of your individual academic achievement, and will continue to receive the respect and recognition it deserves. Familiarize yourself with the University of Toronto's Code of Behaviour on Academic Matter. Potential offences include, but are not limited to:

Assignments:

- Using someone else's ideas or words without appropriate acknowledgement.
- Copying material word-for-word from a source (including lecture and study group notes)
- Obtaining or providing unauthorized assistance on any assignment including
  - working in groups on individual assignments – this includes giving hints to help them get to the answer!
  - having someone rewrite, edit, or add material to your work while editing.
  - researching for inspiration, hints, or answers to any graded problem
  - Posting assignment questions on discussion forums/private tutoring companies for hints/tips/solution (this includes Piazza)
- Lending your work to a classmate who submits it as his/her own with or without your permission

On tests and exams:

- Using or possessing any unauthorized aids, including a cell phone, smart watch, programmable calculators.
- Looking at someone else's answers or allowing someone to look at yours
- Falsifying or altering any documentation required by the University, including doctor's notes

The University of Toronto treats cases of academic misconduct very seriously. All suspected cases of academic dishonesty will be investigated following the procedures outlined in the Code. The consequences for academic misconduct can be severe, including a failure in the course and a notation on your transcript. **If you have any questions about what is or is not permitted in this course, please do not hesitate to contact the instructor.** If you are experiencing personal challenges that are having an impact on your academic work, please speak to the instructor or seek the advice of your college registrar.

Tentative Schedule:

Week	Topics
1: Jan. 6 - 10	Review of Prior Concepts, Methods of Data Collection, Descriptive Plots
2: Jan. 13 - 17	Descriptive Plots, Summary Statistics, Estimator Properties (unbiasedness, consistency)
3: Jan. 20 - 24	M.O.M, M.L.E
4: Jan. 27 - 31	What Makes a Good Estimator?, Sampling Distributions, Confidence Intervals for Means
5: Feb. 3 - 7	Chi-Squared Distribution, CI for Variance, Bootstrapped CIs
6: Feb. 10 - 14	Statistical Testing: Structure and Intuition, Type 1 & Type 2 Errors, Power
7: Feb. 17 - 21	Reading Week
8: Feb. 24 - 28	Simulated P-values, Hypothesis Testing vs CI, Comparing Two Sample Means
9: Mar. 2 - 6	MIDTERM, Paired T-Test and Sign Test
10: Mar. 9 - 13	Inference on Categorical Data, Goodness of Fit Tests
11: Mar. 16 - 20	Intro to Simple Linear Regression, Inference and CI on β
12: Mar. 23 - 27	Linear Regression - Con't
13: Mar. 30 - Apr. 3	Analysis of Variance and/or Review