Winter 2021 Syllabus for ECE286H1
Probability and Statistics

Instructor: Mark Ebden

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Office hours: 1-2:30 pm on Mondays or 9-10:30 am on Wednesdays, by appointment.
　　　　　To book, click either of the above underlined links.
　　　　　If you have time-zone difficulties, email me your alternative availabilities.

Background: My experience has mainly been in the analysis of *scientific data* using probabilistic approaches, in Britain and North America. In 2018 I taught about half of STA286 (the old name for ECE286). This is my first time teaching an online course.

Course webpage: Accessible through Quercus at https://q.utoronto.ca

Classroom sessions: From Mon 11 Jan to 16 April
- Synchronous lectures: Mondays 10-11 am. To be held over Zoom, tentatively.
- Asynchronous lectures: Two hours per week (including re-watching time)

Tutorials: From Mon 18 Jan to 16 April. To be held over Zoom, tentatively.
- TUT0105 Mondays 4-5 pm (recorded) with Danny (Yi Fan)
- TUT0107 Tuesdays 2-3 pm (recorded) with Danny (Yi Fan)
- TUT0104 Wednesday 2-3 pm (recorded) with Hadeel
- TUT0108 Wednesdays 2-3 pm (nonrecorded) with Javad
- TUT0101 Wednesdays 3-4 pm (recorded) with Javad
- TUT0102 Fridays 10-11 am (recorded) with Shiva
- TUT0103 Fridays 10-11 am (nonrecorded) with Hadeel
- TUT0106 Fridays 12-1 pm (recorded) with Shiva

To switch from a recorded tutorial group to a nonrecorded one, email your advisor:
- Stephen Johns (domestic students): engsci12@utoronto.ca
- Justina Lee (international students): engsci12.intl@utoronto.ca

Include your current group (e.g. TUT0101) and preferred new group(s). In practice, there might not be much difference between being in a recorded tutorial versus a nonrecorded tutorial, because much of the interaction is expected to occur among your peers in breakout groups.

More information about the format of tutorials is on the Tutorials page in Quercus.
TAs will also hold a very limited number of office hours before the largest assessments.
The seven TAs are: Majid, Susanna, Ahmad, and the four appearing above.

Course Content

A general introduction to probability and applied statistics for engineers. Topics include:
- Definitions of sample space, events, probability, conditional probability, Bayes' theorem.
- An overview of discrete- and continuous random variables and their distributions; joint-, marginal-, and conditional distributions; expectation; transformation of random variables; moment generating function.
- Central limit theorem; sampling distributions of $\bar{X}$ and S-squared; the χ-squared-, t-, and F-distributions; point- and interval estimation of population parameters; method of maximum likelihood; hypothesis testing.
- Fitting the distribution to the data, probability plots, goodness-of-fit tests. Simple linear regression.

Textbook

Our textbook is *Probability and Statistics*, 9th edition, by Ronald Walpole et al, 2017. We will cover some of Chapters 1 to 11. ISBN: 978-0-13-411585-6.

If you find something in the textbook to be unclear and you seek a second explanation, know that our course content is partially addressed in Chapters 1 to 11 of *Mathematical Statistics with Applications,* by Dennis Wackerly *et al.* (7th edition, 2008). ISBN: 978-0495110811. This is entirely optional reading.

Evaluation

Assessment	Weight	Tentative Dates *(not confirmed)*
Warmup quiz	0%	7 pm on 25 January
Assignment	15%	Due 4 pm on 26 February
Tests	20% + 30%	9 am on 4 February & 18 March
Final exam	35%	Thursday 29 April

Regarding the 0% warmup quiz: its chief purpose is to ensure familiarity with the upload methods. On the advice of administration: although the quiz is worth zero, if you "do not complete the quiz, there will be no leniency for failure to submit properly on a test".

You are not evaluated on attendance or similar forms of participation. But, generally the more you put into a course the more you'll get out of it.

Assessments

For this entirely online course, important information about all assessments is on the Assessments page in Quercus. The plan is to use Crowdmark software, at least initially.

Independent Work

Each assessment will contain instructions on what comprises cheating and what is allowed. In brief:

- For the Assignment, if you work with other students then you'll be asked to indicate the names of the students. Your solutions must be written up independently (i.e., your solutions should not be the same as another student's solutions).
- For the Tests and Exam, any information at q.utoronto.ca, or in printed material, or on the internet, as well as any computing resource such as a calculator or a computing platform such as IDLE etc, is allowed provided that there is no *interaction* with other people directly or indirectly.

Submission policy

For all timed assessments, you will be given a finite time period for each of

   (1) working on the assessment and

   (2) submission procedures (scanning or photographing, uploading etc.).

After these two specified times pass, submissions will be accepted with a late penalty per-minute rate as specified on the assessment. This is expected to be:

- 3% per minute for tests/exam, and
- 1% per hour for the Assignment

Exceptions can be made to the above when your lateness is followed in due course by a formal petition (within 24 hours) and documentation from you. Documentation may include evidence (pictures, screenshots, reports) of a failed upload, internet outage, etc. depending on the cause of the delay. If the cause of the delay is health or personal crisis, the formal petition period will be extended to three days (72 hours).

If you're ill or in crisis, please use the ACORN Absence Declaration Tool as documentation. Petitions can be submitted [here](); use a Term-Work Petition for in-term assessments, or a Final-Exam Petition for the exam.

For time-zone accommodations, please file a [petition]() *and* email the instructor to state what time zone you are in, at least seven (7) days before the assessment. This is necessary because there's often a lag between petition filing and approval; contacting the instructor directly allows for an appropriate response in time for the assessment.

Marking concerns

Requests to have an assessment re-evaluated owing to a potential grading oversight must be made in writing within *one week* of the date the work was returned. The request must contain a justification for consideration. Send your request to sta286me@gmail.com. Note that your score may go down as well as up.

Computing and Calculators

You will need a basic scientific hand-calculator, with statistical functions, logarithmic functions etc, and experience in working with it (start using it from the first day). Alternatively, a calculator app on your computer will do.

You will see from old midterms that manual calculations are a part of this course.

For those looking for something more advanced to play around with, Python can come in handy. It is not required.

Online Discussion Board

The Piazza system is catered to getting you help quickly and efficiently from classmates, TAs, and the lecturer. Rather than emailing questions to the teaching staff, we encourage you to post your questions on Piazza. To sign up for the discussion forum, go to the course webpage and in the lefthand menu click on 'Piazza'.

To view the page without Quercus menu items taking up some of the screen, visit piazza.com/utoronto.ca/winter2021/ece286

Signing up for the discussion board is optional.

Additional help

Practice problems from the textbook for your home preparation will be posted on the website. They are not to be handed in. The solutions will be posted before each tutorial. You may discuss them in tutorials and elsewhere.

Need extra help with the coursework? Here are some options:
-   For continued class discussion and questions outside of class, try posting on the discussion forum. The instructor (and maybe TAs) will be monitoring it
-   You may choose to join (or create) an informal study group
-   E-mail the instructor for emergencies, personal matters, and course feedback
-   You are encouraged to contact course staff for upcoming time-zone issues well in advance. Please email sta286me@gmail.com.

How to communicate with your instructor

Questions about course material such as:
-   How do I do this question in the textbook?
-   What is standard deviation?
-   When is the test?

can be posted on the Piazza discussion forum. If you are shy, questions can be posted anonymously (so that the author is anonymous to other students but not to the instructor).

For private communication, e-mail me. Use your utoronto.ca e-mail account and include your full name and student number.

You may post entirely anonymous feedback to the instructor here. Nobody will know who you are. In past courses this has helped sort out small problems and big ones.

Academic integrity

You are responsible for knowing the content of the University of Toronto's Code of Behaviour on Academic Matters at www.governingcouncil.utoronto.ca/policies/ behaveac.htm. If you have any questions about what is or is not permitted in this course, please do not hesitate to contact your instructor.

Accessibility needs

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom, or course materials, please contact Accessibility Services as soon as possible: accessibility.services@utoronto.ca or http://accessibility.utoronto.ca.

Notice of video recording and video sharing
(Download permissible; reuse prohibited)

At times during this course, some interactions, including your participation, may be recorded on video and will be available to students in the course for viewing remotely and after each session. Course videos and materials belong to the instructors, the University, and/or other source depending on the specic facts of each situation, and are protected by copyright. In this course, you are permitted to download session videos and materials for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the instructor.

Links to recorded lectures will appear on the Lectures page in Quercus.

Your responsibilities

The online sessions for this class are designed to actively engage you in the course material. We hope you'll find them interesting, challenging, fun, and an excellent opportunity to truly learn the material.