

# THE PRACTICE OF STATISTICS I

## STA 220H1F – Fall 2020

Instructor	Section	Time (Location: Bb Collab)
Karen Huynh Wong e. karen.huynhwong@utoronto.ca	L0101 (Env Sci)	M 10 AM-12 PM
Katherine Daignault e. katherine.daignault@mail.utoronto.ca	L0201 (Health & Life Sciences)	R 3-5 PM
Gwendolyn Eadie e. gwen.eadie@utoronto.ca	L0301	R 11 AM-1PM
Shahriar Shams e. shahriar.shams@mail.utoronto.ca	L5101	T 7-9 PM

### How and when will the course operate?

The course will be offered entirely online this year, with weekly synchronous meetings held in Bb Collaborate. Save the monthly course schedules found on Quercus ([q.utoronto.ca](http://q.utoronto.ca)) to stay on top of the weekly tasks! **All listed times are in local Toronto time. If you are in a different time zone, you are responsible for any time conversions.** It is recommended that you schedule important dates and times into your calendar at the beginning of term with reminders to avoid missing anything!

### Course content

*Course materials provided on Quercus are for the use of students currently enrolled in this course only. Sharing (e.g., posting, providing, selling) course materials with anyone outside of the course is considered unauthorized use.*

This course will provide an intuitive introduction to fundamental statistical concepts and reasoning. The course will cover: methods of data collection; constructing effective graphical and numerical displays; estimating and describing the natural variability in data; and the key ideas in how statistical tests can be used to separate significant differences from those that are only a reflection of the natural variability in data.

The learning objectives of the course are:

- Understand the ideas, principles, and considerations that are common to all statistical methods,

- Develop a statistical toolbox of some methods for the collection, analysis, and display of data,
- Identify appropriate uses of the statistical methods, including their strengths and limitations, and
- Develop statistical literacy, including the ability to recognize the importance of data in decision-making and understand the social and scholarly applications of statistics.

## Topics to be covered

<b>Topic</b>	<b>Description</b>
A first look at data	Summary statistics and graphical displays for a single categorical or quantitative variable and for relationships between two variables.
Collecting Data	Sampling. Observational studies and experiments. The effect of confounding and concluding causation.
Probability	Probability models, Bayes' theorem, the normal distribution, the Law of Large Numbers, the Central Limit Theorem, sampling distributions.
Confidence Intervals	Confidence intervals for proportions and means.
Statistical Tests	Tests of significance for proportions and means.
Two Samples	Tests of significance and confidence intervals for proportions and means in the two-sample case.
Linear Regression	Method of least squares, evaluating model fit, the effects of outliers and influential observations.

## Your responsibilities

The course is designed to actively engage you in the course material. We hope

you'll find the subject of statistics interesting, challenging, and fun, and an excellent opportunity to truly learn the material. Each week, you will be introduced to the course material through video lectures, with fine-tuning and learning support in your synchronous meetings *in the following week*. In order for the in-class sessions to be effective, *preparing by learning about the week's concepts through the video lectures and notes is essential*. Make use of the posted monthly schedules and the suggested study routine on Quercus!

## Textbook

There is no required course textbook. All course material is contained in the video lectures and their corresponding notes. Two recommended textbooks are:

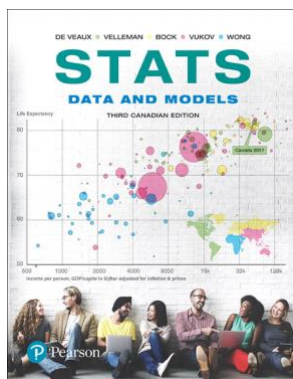
**1. OpenIntro Statistics 4<sup>th</sup> Ed.** Diez, D. Barr, C. D., and Cetinkaya-Rundel Mine.

[www.learnpub.com/openintro-statistics](http://www.learnpub.com/openintro-statistics)



OpenIntro Statistics (4<sup>th</sup> edition) is free and available to download. You can also choose to pay what you can for the textbook, purchase a physical copy on Amazon for \$20 or \$60. This is an excellent textbook that is less conversational compared to the Velleman et al. textbook. However, the concepts are clearly explained. A nice feature of the text and website is that many of the examples and vignettes used to illustrate the concepts are based on real applications of statistics.

**2. Stats: Data and Models**, third Canadian edition, by Richard D. De Veaux, Paul F. Velleman, David E. Bock, Augustin M. Vukov, and Augustine C.M. Wong. 3<sup>rd</sup> ed.



The digital textbook is available for purchases [HERE](#). It is extremely easy to read and is written in a conversational style. Most of the concepts are clearly explained and there are lots of fun and interesting vignettes that illustrate statistical concepts.

## Calculators

You will need a calculator. A scientific calculator is recommended for ease of use, but any calculator that can perform basic operations, and take powers and logarithms is sufficient.

## Computing

We will use R for all examples. R is freely available for download at <http://cran.r-project.org> for Windows, Mac, and Linux operating systems. It is strongly recommended that you also download R Studio ([www.rstudio.com](http://www.rstudio.com)) to accompany R for a nicer user interface. If you encounter tech problems with the installation, you can also opt to use R Studio cloud ([rstudio.cloud](http://rstudio.cloud)) which includes up to 15 project hours per month.

You will not need to know R commands, but you do need to know how to read and interpret output from R. If you are interested in learning to replicate the work done in the video lectures, there are option R videos that walks you through the syntax and steps in R.

## Discussion Forum

All sections of STA220 will be using Piazza for discussions surrounding course content. This will be a space for you to post your questions (general, textbook, practice), your answers (what you tried, where you are getting stuck), or suggestions to your peers. Piazza will be monitored regularly by instructors and teaching assistants. You can join Piazza for our course [here](#). Be sure to familiarize yourself with their [privacy policy](#) before opting in to use!

## Additional Help

Need extra help with the coursework? Here are some options:

- Post your question on the class discussion forum on Piazza. The instructor and TAs will monitor this discussion forum regularly.
- The instructor and TAs will have weekly office hours on Bb Collaborate.
- E-mail should only be used for emergencies or personal matters. If you

email course questions to the instructor or TA, you will be asked to post your question on the discussion forum. Individual questions about the course content will not be answered via email.

## Evaluation

Assessment	Weight	Date
Mini-Homework (Best 2 of 3)	2 x 3% each	Sept. 27, Nov. 1, Nov. 29
Weekly Quiz (11)	11x 4% each	Saturdays @ 11:59 PM
Midterm (2)	2 x 10% each	Oct. 24 & Nov. 28, 1-3 AM/PM
Final Project	15%	Dec. 10
Final Assessment	15%	Scheduled by FAS

**Minimum Passing Requirement:** Students must complete and submit at minimum:

- Half (5) of the weekly quizzes
- At least one midterm
- The final project and the final assessment

If you miss more than these minimum passing requirements, even with accommodation, you will not be able to pass this course. There are no make-up quizzes. If there are extenuating circumstances that will affect your performance in the course in the long term, you will be responsible for contacting and informing your instructor as early as possible.

## Midterms

There are TWO midterms in this course. The midterms have two time slots: 1-3 PM EDT and a mirrored time slot 1-3 AM EDT. A survey will be sent out one week before the midterm for sign-ups for the timed slot.

**If you know you will have a time conflict with the midterm**, it is your responsibility to alert your instructor as soon as possible, with **at least two weeks' notice**. Be sure to flag all important dates from all your courses the moment you receive each course syllabus. Requests within two weeks of the test date will not be accepted, and the missed test will receive a zero.

The midterm will consist of TWO parts:

- Part 1 will be 60 minutes long, all multiple choice and/or true/false, held on Quercus.

- Part II will be 40 minutes long, short answer questions that will be submitted on Crowdmark

	Date	Time
Midterm 1 (Modules 1-4)	October 24, 2020 (Saturday)	1-3 AM/PM EDT <ul style="list-style-type: none"> <li>○ 1-2 AM/PM: Part 1: MCQ</li> <li>○ 2-2:40 PM: Part II: Short Answer</li> <li>○ 20 minutes to submit your answers on Crowdmark</li> </ul>
Midterm 2 (Modules 5-8)	November 28, 2020 (Saturday)	1-3 AM/PM EST <ul style="list-style-type: none"> <li>○ 1-2 AM/PM: Part 1: MCQ</li> <li>○ 2-2:40 PM: Part II: Short Answer</li> <li>○ 20 minutes to submit your answers on Crowdmark</li> </ul>
Weekly quizzes	Saturdays (see course schedule)	Submit by 11:59 PM Toronto Time

## Marking concerns

Any requests to have your midterm test remarked must be made in writing to your instructor within one week of receiving your test results. The request must contain a justification for consideration, and evidence that you have first reviewed the posted solutions.

## Weekly Quizzes

You will be given an online quiz on the topics covered in the weekly modules. These quizzes should be **completed after watching the videos and reading the notes** posted each week. You have **four** attempts for each quiz, and the highest grade will be recorded.

- The quizzes will be held on Quercus and are always due on Saturday at 11:59 PM (23:59) Toronto time. Please see the course schedule for specific due dates. There will be no accommodations made for the weekly quizzes.
- The weekly quiz will cover material in that week's **module (video lectures and accompanying notes)**
- The quiz will consist of multiple choice and true/false questions, randomly chosen from a pool of questions.

- The number of questions will vary from week to week but the quizzes will be equally weighted.
- You will find out your score immediately and you can take the quiz up to four times until the Saturday 11:59 PM deadline.
- Your final quiz score will be the highest score from all of your attempts. Note that you will get a different randomly generated quiz each time. This means that you will not be penalized for taking the quiz again even if you obtain 100% on a previous attempt.

## Missed Tests & Mini-Homework

- If a midterm or mini-homework is missed for a valid medical reason, you must fill out the absence declaration form on ACORN **and** inform your instructor **within one week following the test**. Requests after this deadline will not be accepted.
- If a test is missed for a valid, documented reason, then you will have an opportunity to write an online makeup test. The instructor will schedule the time and date of the makeup test.
- If you miss both the originally scheduled and makeup tests without valid documentation, then a grade of zero will be assigned for the makeup test. Otherwise, the weight of the midterm will be equally distributed between the final project and the final assessment.
- Other reasons for missing a test will require prior approval by your instructor. If prior approval is not received for non-medical reasons then you will receive a grade of zero for the missed midterm test.
- Documented missed mini-homework will first be counted as a 0 before being reweighed among the remaining mini-homework.

## How to communicate with your instructor

Questions about course material should be posted on the discussion forums on Piazza. Questions can be posted anonymously (so that the author is anonymous to other students but not to the instructors), if desired.

If your communication is private, such as, "*I missed the test because I was ill*", then e-mail your instructor. Use your utoronto.ca e-mail account to ensure that your message doesn't automatically go to a Junk folder and include **your full name, student number, and course section (L0101/L0201/L0301/L5101)**.

## Academic integrity

You are responsible for knowing the content of the University of Toronto's Code of Behaviour on Academic Matters [here](#). 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, or course materials, please contact Accessibility Services as soon as possible: [accessibility.services@utoronto.ca](mailto:accessibility.services@utoronto.ca) or <http://accessibility.utoronto.ca>.