

STA220: The Practice of Statistics I

Vivian Ngo
Summer 2020

Lectures: Mondays and Wednesdays 6-9pm on Bb Collaborate

** Note that all the times stated in this syllabus are in EST.*

Instructor Information

Email: viv [dot] ngo [at] mail [dot] utoronto [dot] ca

Instructor's office hours: TBD, held on Bb Collaborate

Teaching Assistant office hours: TBD, held on Bb Collaborate

Course Website

Course content, lectures, and assessments will be held on Quercus (<https://q.utoronto.ca/>).

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.

Course Description

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.

Discussion Forum

All sections of STA220 will use Piazza as a platform for discussion. Please sign up at piazza.com/class/summer2020/sta220h1f. The access code is sta220-summer. You may also utilize the discussion board provided on Quercus if you prefer.

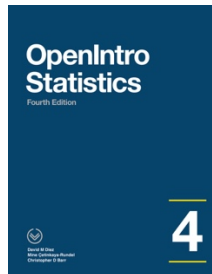
Textbook

There is no required course textbook. All of the course material is contained in the lectures and assigned work. There are many textbooks that cover topics in the course, which are listed below:

1. OpenIntro Statistics 4th Ed. Diez, D. Barr, C. D., and Cetinkaya-Rundel Mine.

<https://leanpub.com/openintro-statistics>

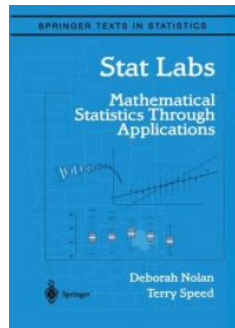
OpenIntro Statistics (4th edition) is free and available to download. A nice feature of the text and website is that many of the examples and vignettes used to illustrate the concepts are based on real applications of statistics.



2. Stat Labs: Mathematical Statistics Through Applications D. Nolan, T. Speed.

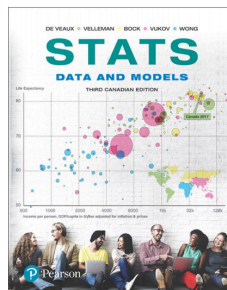
<https://search.library.utoronto.ca/details?11755607>

Mathematical Statistics Through Application is available through the U of T library for free. A nice feature of this text is that it uses many examples. Every chapter focuses on a real-life application and motivates statistical methods.



3. 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. 3rd ed.

This textbook is available at the University of Toronto bookstore. 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.



Statistical Software

We will use R and RStudio/RStudio Cloud for all examples.

- RStudio Cloud is an online platform that we will utilize throughout the term.
- If you are comfortable and would prefer local software, you may also install R and RStudio on your computer.
- R is freely available for download at <https://www.r-project.org/> for Windows, Mac, and Linux operating systems.
- After downloading R, you will need to download RStudio (its free version) at <https://rstudio.com/>.
- Please remember to save your work and create backup files to prevent any loss of information.

Calculator

You may need a basic calculator to complete the assessments in this course.

Course Components

Lectures

Every lecture provides an introduction to important statistical ideas and will guide you through statistical examples to develop statistical literacy, reasoning, and thinking. Every lecture will be composed of theoretical explanation as well as application through examples. Attendance and participation are highly recommended as lectures will build on top of previous lectures.

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. In order for the online classes to be effective, preparing in advance by learning about the week's concepts through the videos and notes is essential.

This course is fast-paced and the material is cumulative, and it will be difficult to understand new concepts if you don't understand previous concepts. This means it's really easy to fall behind - it's even easier in this section since this is an online class. It is strongly recommended that you set aside regular time each week to devote to this course and participate in the weekly online sessions. Also, be sure to ask questions to the instructor or TAs as soon as any concept(s) are the least bit unclear.

Course Schedule

Class	Date	Topics	Notes
1	05/04	*Classes start Syllabus coverage R and RStudio Cloud/RStudio Summarizing Data: One Variable	*Quiz due 24 hours after every lecture (9pm on Tuesday and Thursday)
2	05/06	Summarizing Data: Relationships Between Variables	May 10 is the last day to enrol!
3	05/11	Probability: Events	Bonus Syllabus Quiz due Tuesday 11:59pm (05/12)
4	05/13	Probability: Random Variables	HW1 due Sunday 11:59pm
-	05/18	*No classes (Victoria day)	
5	05/20	Sampling Distributions	HW2 due Sunday 11:59pm
6	05/25	Confidence Intervals Part 1	
7	05/27	Confidence Intervals Part 2	HW3 due Sunday 11:59pm
8	06/01	The Process of Statistical Tests *Last day to drop or CR/NCR course	
9	06/03	Effective Use of Statistical Tests	HW4 due Sunday 11:59pm
10	06/08	Comparing Two Groups	
11	06/10	Simple Linear Regression	HW5 due Sunday 11:59pm
12	06/15	Data Collection *Last class	
	06/16	Study day	
	06/17 – 06/25	Final assessment period	Final Project and Course Incentive due 11:59pm (06/25)

**Note that this schedule is tentative and subject to change. Suggested readings will be provided regularly on Quercus.*

Grading Scheme

Assessment	Due Dates	Breakdown	Total
Quizzes	24 hours after every lecture (Bonus quiz due May 12 11:59pm)	(Top 10 out of 12 quizzes) x 2% Bonus Syllabus quiz (1%)	20% (+1% bonus)
Homework	Every Sunday at 11:59pm (05/17, 05/24, 05/31, 06/07, 06/14)	5 x 11%	55%
Final Project	June 17-25	1 x 25% Bonus Course Incentive (2%)	25% (+2% bonus)

Quizzes

Every lecture will be followed by a quiz that assesses your understanding of that lecture. The quizzes are also designed to help you keep up with course material. They will be posted at 9pm on the Mondays and Wednesdays of our lectures, and will be due 24 hours later at 9pm on Tuesdays and Thursdays. The time limit for each quiz is 20 minutes. Late quizzes will not be accepted and will result in a grade of zero.

The quizzes will be open book, meaning that you are allowed to utilize course materials and textbooks to complete the quizzes. However, you may not discuss quiz questions with anyone, whether they are associated with the course or not. It is an academic offence to share your quiz answers with another person or to submit another person's work as your own and will be reported as such. Academic offenses will be taken very seriously and dealt with accordingly.

Homework Assignments

There will be five homework assignments in total for this course. One homework assignment will be due every Sunday at 11:59pm, with the first assignment due on May 17th (05/17, 05/24, 05/31, 06/07, 06/14) and will be posted on Quercus a week before they are due. Homework assignments are designed to assess your statistical literacy, reasoning, and thinking. These assignments will cover material from the beginning of the course so it is important to maintain a good understanding of course content as the term progresses.

As noted above, homework assignments will be due at 11:59pm on Sunday. Please note that as the deadline approaches, technical difficulties may occur, resulting in submissions that are a few minutes late. To avoid this problem, please aim to submit your assignment at an earlier time. Homework assignments will be accepted if they are up to one day late, but will be penalized at 25% (e.g. 30 minutes, 5 hours, or 20 hours late will all result in a 25% deduction). Homework assignments will not be accepted if they are more than one day late. This rule is strict, implemented automatically by Quercus, and will not be waived for reasons other than medical, accessibility, etc, discussed previously with the instructor.

The homework assignments will be open book, meaning that you are allowed to utilize course materials and textbooks to complete the quizzes. You may ask questions about the assignments or discuss with other students. However, the homework assignments are not group assignments and any submitted work must be your own. It is an academic offence to share assignment answers with another person or to submit another person's work as your own and will be reported as such. Academic offenses will be taken very seriously and dealt with accordingly.

Final Project

The final project will allow you an opportunity to apply statistical methods to a real-life example. Emphasis will be made on the quality of data analysis and communication. The final project will be a group project and will require you to create a short video of roughly 5 minutes. More details will be announced as the assessment period approaches. Late submissions will not be accepted and will result in a grade of zero.

Bonus Course Incentive

In addition to the requirements of the final project, you have the opportunity to earn bonus marks (up to 2%, added to the course grade) by building a creative piece that conveys statistical information gained from the analysis done in the project. Some examples of creative pieces include a pamphlet, drawing, painting, mind map, song, or video (separate from the required video of the project). For this bonus component, you are encouraged to think beyond numbers.

Bonus Syllabus Quiz

This will be a short quiz to assess your understanding of the syllabus. It is also a chance to earn 1% bonus mark (added to the course grade).

Marking concerns

Any request to have assessments re-evaluated must be made in writing by email within one week of the date the marks were posted. The request must contain a detailed justification for consideration, specific references to relevant course material, and include your name and student number. Without all of these, your request may not be addressed. Please note that the instructor reserves the right to review the grading of all questions when you submit a re-evaluation request (i.e., your grade could go down).

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.
- Attend an office hour. The instructor and TAs will have weekly office hours, with times posted on the course website.
- 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. In other words, individual questions about the course content will not be answered via email.

How to communicate with your instructor

Questions about course material, such as,

- How do I do question 3.7 in the textbook?
- What is standard deviation?
- When is the midterm?

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 quiz 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, course code, and course section. You **must include “STA220” in the subject line** of the email to ensure that it is read.

Academic Integrity

You are responsible for knowing the content of the University of Toronto’s Code of Behaviour on Academic Matters here:

- Code of Behavior on Academic Matters:
<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>
- Academic Integrity: <https://www.academicintegrity.utoronto.ca/>

Working collaboratively with other students in this course can help you learn the material, if done in a productive way. Explaining concepts and working towards solutions together helps everyone understand the material better. Therefore, you are encouraged to form groups to review the material and work through practice problems together. In this course, different assessments permit different levels of independent work

- Quizzes – “open-book”, you cannot work with others and must submit your own work.
- Homework Assignments – “open-book”, you may discuss with other students, but you may not share answers. You must submit your own work.
- Final project – “open-book”, you must collaborate with your group members for the group work component. However, you may not discuss with other groups.

Accessibility Centre

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the class room, or course materials, please contact Accessibility Services as soon as possible:

accessibility.services@utoronto.ca or <http://accessibility.utoronto.ca>.