

# THE PRACTICE OF STATISTICS I

## STA 220H1F – Fall 2015

Instructor	Section	Time (Location)
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Olga Chilina Office: SS6025 e. <a href="mailto:olgac@utstat.toronto.edu">olgac@utstat.toronto.edu</a>	L0101	T 3-4 (ESI050) R 3-5 (ESI050)
	L5101	T6-9 (PB B150)
Dr. Shivon Sue-Chee Office: SS6026 e. <a href="mailto:shivon.sue.chee@utoronto.ca">shivon.sue.chee@utoronto.ca</a>	L0301	T 11-12 (WB116) R 11-1 (WB116)
TBD	L0601	M 3-5 (BA1160) W 4-5 (HS610)

### How and when will the course operate?

See the "Course Schedule".

### Course content

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

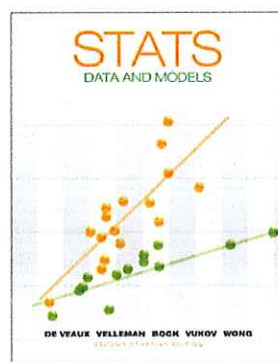
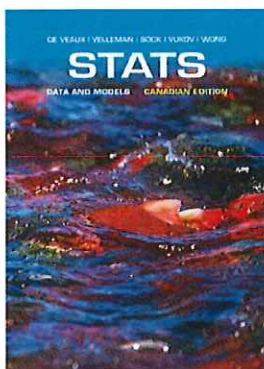
<u>Topic</u>	<u>Description</u>
A first look at data	Summary statistics and graphical displays for a single categorical or quantitative variable and for relationships between two variables.
Collecting Data	Sampling. Observational studies and experiments. The effect of confounding and concluding causation.
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.

## Textbook

There is no required course textbook. All of the course material is contained in the videos and notes.

There are many textbooks that cover the topics in the course. Two recommended textbooks are:

1. **Stats: Data and Models**, first Canadian edition, by Richard D. De Veaux, Paul F. Velleman, David E. Bock, Augustin M. Vukov, and Augustine C.M. Wong. 1<sup>st</sup> or 2<sup>nd</sup> 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.

2. **OpenIntro Statistics**. Diez, D. Barr, C. D., and Cetinkaya-Rundel Mine.  
<https://www.openintro.org/stat/textbook.php>



OpenIntro Statistics is free and available to download. 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.

## Calculators

You will need a calculator. Any calculator that has logarithmic functions will be sufficient. Calculators on phones or other devices equipped to communicate with the outside world (for example, through the internet or cellular or satellite phone networks) will not be permitted during the term test and the final exam.

## 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. For the test and exam, you will need to know how to interpret output from R. You will not need to know R commands. Those of you who would like to learn how to do the analysis yourself using R can watch the optional R videos (which show how to replicate the work done in the video lectures).

## Discussion Forum

All sections of STA220 will be using Piazza as a platform for discussions. Details will be given during the first week of classes on how to sign up.

## 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.
- E-mail should only be used for emergencies or personal matters. If you email a question to the instructor or TA then 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.

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(L0201/L0101/L5101/L0301/L0601)*

## Evaluation

	Weight	Date	Time	Location
Midterm #1	15%	Week of October 19 during the 1 hour class	During class time	TBD
Midterm #2	15%	Week of November 16 during the 1 hour class	During class time	TBD
In-class problems	9%	The two-hour class in your section	During the last 20-30 minutes.	In class
Weekly quizzes	10%	Sundays	Submit by 23:59	Online (Portal)
Research survey	1%	Pre-survey: Within one-week of enrolling in the course. Post-survey: Within one-week of completing the course		Online (Portal)
Exam	50%	Scheduled by Faculty of Arts and Science		

## Weekly assignments

### 1. Weekly quiz.

This is an online quiz on the videos that you watched during the week. This should be done after watching the videos posted each week.

- By each Sunday at 23:59, you must complete an online quiz on The Portal.
- The weekly quiz will cover material in the videos to be watched that week.
- 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 as many times as you'd like up to the Sunday 23:59 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.

### 2. Weekly in-class problem.

Almost every week a problem will be given during the last 20-30 minutes of the two-hour class. The weekly in-class problem will be based on the material being discussed in class that week. Your solution to the problem should be handed into a TA or the instructor by the end of class.

Your solutions to the weekly problem will not be accepted after the end of the class.

## Term test and exam

Term test #1 will be written in class the week of October 19, 2015. You will have 45 minutes to complete the test. The exact date and time will depend on your section.

Term test #2 will be written in class the week of November 16, 2015. You will have 45 minutes to complete the test. The exact date and time will depend on your section.

The faculty of arts and science schedules the final exam. You must bring your student identification to the final exam.

## Missed Tests

- If a test is missed for a valid medical reason, you must submit the University of Toronto Verification of Student Illness or Injury form (<http://www.illnessverification.utoronto.ca>) to your instructor within one week of the test.
- The form will only be accepted as valid if the form is filled out according to the instructions on the form.
- **The form must indicate that the degree of incapacitation on academic functioning is moderate, serious, or severe in order to be considered a valid medical reason for missing the term test. If the form indicates that the degree of incapacitation on academic functioning is negligible or mild then this will NOT be considered a valid medical reason.**
- If a test is missed for a valid reason then you will be given a multiple choice online makeup test. The instructor will schedule the time and date of the makeup test.
- The online makeup test will be worth 7.5% of the final grade and the remaining 7.5% will be added to the value of the final exam.
- If a student misses both the originally scheduled and makeup tests then a grade of zero will be assigned for the makeup test.
- 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.

## Marking concerns

Any requests to have discussion forums or hand in problems re-evaluated must be made in writing directly to the TA within one week of the date the work was marked. The request must contain a justification for consideration.

## 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?

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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 and student number.

## Academic integrity

You are responsible for knowing the content of the University of Toronto's Code of Behaviour on Academic Matters at <http://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 class room, 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>.

## 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 these sessions to be effective, preparing by learning about the week's concepts through the videos and notes is essential.