

THE PRACTICE OF STATISTICS I

STA 220H1F – Fall 2016

Instructor	Section	Time (Location)
Dr. Bethany White Office: SS6024A e. bethany.white@utoronto.ca	L9901	W 9-10 (online-Portal)
	L9902 (Social Work)	W 9-10 (online-Portal)

How and when will the course operate?

See the “Course Schedule” (last page of this syllabus).

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.

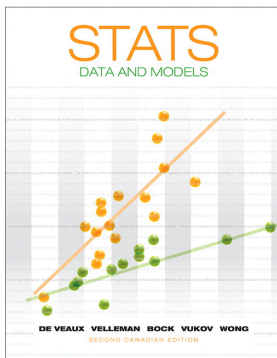
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Textbook

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 if you would like a book for reference. Two recommended textbooks are:

1. Stats: Data and Models, second Canadian edition, by Richard D. De Veaux, Paul F. Velleman, David E. Bock, Augustin M. Vukov, and Augustine C.M. Wong. 2nd 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 basic calculator will be sufficient (no statistical functions are necessary). 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 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).

Additional help

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

- **Have a question about STA220 online course content or administration?**
 - Review the questions already posted on the Portal discussion board for the STA220 online section, and if your question hasn't already been addressed, post your question there.
 - Visit the instructor's and TA's office hours (Instructor office hours will be available online and in-person on campus –hours will be posted on Portal.)
- Post your **course content question** on the class discussion forum on Piazza (and/or review the questions and answers already posted): All 7 sections of STA220 will have access to a common Piazza forum for questions. This forum will be monitored regularly by TAs. Details on how to sign up will be given during the first week of classes.
- **Need to reach the instructor about a personal matter (e.g., illness, grades)?** Email the instructor. Note that e-mail should only be used for emergencies or personal matters. If you email a question to the instructor about course material or course administration, then you will be asked to post your question on the Portal discussion board – these types of questions will not be answered via email. Note also that the TAs will not be available for contact over email, etc, outside of their scheduled office hours or online forums or sessions.

Evaluation

Assessment	Weight	Notes
Weekly quizzes	14%	
Online Term Test	8%	
Assignments (3)	18% (6% each)	
Participation in online class sessions (<i>must participate in at least 5 of the 6 for full credit</i>)	5% (1% each)	
Online discussion participation (intro and closing)	4% (2% each)	
Research survey	1%	through Portal Pre-survey: Within two-weeks of enrolling in the course. Post-survey: Within one-week of completing the course
Final Exam	50%	Scheduled by Faculty of Arts and Science

Weekly quizzes

These are online quizzes 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 (i.e., 11:59 pm), you must complete an online quiz on 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 receive a different randomly generated quiz each time.

Online Term Test

The term test will be written online (Portal). You will have 60 minutes (i.e. 1 hour) to complete the test during the availability period – refer to the schedule on the last page of

this syllabus and Portal for more information on the term test and the availability period.

Assignments

Three sets of problems will be assigned during the term. At least some of these may involve working with an online group. Assignment information and instructions will be posted on Portal.

Class Session Participation

There will be **six** synchronous online class sessions (Wednesdays 9:00AM-10:00AM EST) - attendance and participation is mandatory for these sessions (see the Course Schedule on the last page of this syllabus). Participation could involve activities such as completing a survey in advance, or completing online activities during the session. In order to earn the 1% for a particular synchronous class session, you must complete any advance survey or activity and log in and complete the activities throughout the synchronous class session - the specific breakdown of the 1% will vary from session to session and will be posted on Portal in advance.

What happens if you miss a session? You must fully participate in **at least 5** of these sessions to earn the 5% for this component. If you miss (or do not fully participate in) 2 or more of these sessions, your first missed one will automatically not be counted; valid medical documentation for any other(s) missed will shift the 1% participation grade(s) to your final exam.

Tutorials will be held on the other six weeks. It is strongly recommended that you make every effort to attend all class sessions (i.e., to attend the 6 mandatory class sessions + 6 tutorials on Wednesdays, 9:00AM-10:00AM EST).

Online Discussion Participation

There will be two group online discussion activities during the term. You will be required to actively contribute to these discussions for credit. More information on these discussion activities as well as a grading rubric will be posted on Portal.

Final exam

The Faculty of Arts and Science schedules the final exam. You must bring your student identification to the final exam.

The University of Toronto, St. George, Arts and Science final examination will require your attendance on Campus.

If you are eligible and require off-site proctoring, please notify your Faculty registrar and submit your request no later than twelve (12) business days after the start of term.

If requested on time, the Arts and Science Registrar will endeavour to provide arrangements for proctored exam writing for students residing more than 125 km travel

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distance from the campus at a proposed outside examination centre. You must provide the contact information of an institution in your area offering proctoring services, however, please note that the requested location is not guaranteed and an alternative test centre may be identified. Students are responsible for any fees charged by the test centre. Please contact the Faculty Registrar's Office for further details.

For more information see FAQs for Off-Site Exams – this will be available at <http://discover.utoronto.ca/learning/programs-of-study/online-courses> or upon request from your instructor.

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 (*note for the term test, your medical documentation must cover the entire availability period*).
- 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 term test is missed for a valid reason then the final exam will be worth 58% of the final grade; otherwise, if a term test is missed then zero will be recorded for the term test and the final exam will remain worth 50% of the final grade.
- 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 assignments re-evaluated must be made in writing directly to the TA within one week of the date the marks were posted. The request must contain a detailed justification for consideration and make specific references to relevant course material.

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 term test?

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should be posted on the online section Portal discussion board or the discussion forums on Piazza. 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>.

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:

- **Weekly quizzes** – 'open-book', you can work together collaboratively with other students in the course but everyone must submit their own quizzes;
- **Term Test** – 'open-book', you must work independently – no working with others;
- **Assignments** – 'open-book', see Assignment instructions on Portal for details on what collaboration (if any) is permitted;
- **Final Exam** – allowable aids to be announced, you must work independently – no working with others.

Note: Submitting another student's work as your own, or providing your own work to another student for him/her to submit as his/her own is considered as an academic offense (regardless of the assessment) and will be reported as such.

Academic offenses will be taken very seriously and dealt with accordingly.

Therefore, 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 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

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truly learn the material. In order for the synchronous sessions and tutorials 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.

Online STA220 Schedule – Fall 2016

Week	Dates	Module/Topic	Activities & Due Dates
1	Sep 12-18	1- Summarizing Data	Intro discussion (group) – Portal Discussion Board Online meeting (class) – 9-10am, Wed, Sep 14 – Blackboard Collaborate Online quiz #1 due by 23:59, Sun, Sep 18
2	Sep 19-25	2 - Intro to Probability (I)	Intro discussion (group) – Portal Discussion Board Online tutorial (optional) – 9-10am, Wed, Sep 21 – Blackboard Collaborate Online quiz #2 due by 23:59, Sun, Sep 25
3	Sep 26-Oct 2	3 - Intro to Probability (II)	Intro discussion (group) – Portal Discussion Board Online meeting (class) – 9-10am, Wed, Sep 28 – Blackboard Collaborate Online quiz #3 due by 23:59, Sun, Oct 2
4	Oct 3-9	4 - Sampling Distributions	Assignment #1 (description and due date to be posted on Portal) Online tutorial (optional) – 9-10am, Wed, Oct 5 – Blackboard Collaborate Online quiz #4 due by 23:59, Sun, Oct 9
5	Oct 10-16 (Thanksgiving Oct 10)	5 - Data Collection	Online meeting (class) – 9-10am, Wed, Oct 12 – Blackboard Collaborate Online quiz #5 due by 23:59, Sun, Oct 16
6	Oct 17-23	6 - Inference – Confidence Intervals (I)	Online tutorial (optional) – 9-10am, Wed, Oct 19 – Blackboard Collaborate Online MIDTERM (available Oct 20-21)
7	Oct 24-30	7- Inference – Confidence Intervals (II)	Online meeting (class) – 9-10am, Wed, Oct 26 – Blackboard Collaborate Online quiz #6 due by 23:59, Sun, Oct 30
8	Oct 31-Nov 6	8 - Inference – Hypothesis Testing (I)	Assignment #2 (description and due date to be posted on Portal) Online tutorial (optional) – 9-10am, Wed, Nov 2 – Blackboard Collaborate Online quiz #7 due by 23:59, Sun, Nov 6
9	Nov 7-13 (Nov break Nov 7-8)	9 - Inference – Hypothesis Testing (II)	Online meeting (class) – 9-10am, Wed, Nov 9 – Blackboard Collaborate Online quiz #8 due by 23:59, Sun, Nov 13

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10	Nov 14-20	10 - Associations – Comparing two groups	Assignment #3 (description and due date to be posted on Portal) Online tutorial (optional) – 9-10am, Wed, Nov 16 – Blackboard Collaborate Online quiz #9 due by 23:59, Sun, Nov 20
11	Nov 21-27	11 - Associations – Simple Linear Regression	Online meeting (class) – 9-10am, Wed, Nov 23 – Blackboard Collaborate Online quiz #10 due by 23:59, Sun, Nov 27
12+	Nov 28-Dec 4 (Dec 6 last day of classes)	Review	Closing discussion (group) – Portal Discussion Board Online tutorial (optional) – 9-10am, Wed, Nov 30 – Blackboard Collaborate Online quiz #11 due by 23:59, Sun, Dec 4

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