STA 220H1F: THE PRACTICE OF STATISTICS I

Section L0201: Environmental Sciences
Section L0301: Health and Life Sciences
Fall 2013

	Section L0201	Section L0301
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Office hours:	Mondays 12:10–13:00 Wednesdays 11:10–12:00	Tuesdays 12:10–13:00 Thursdays 13:10–14:00
Teaching assistants:	TBA	
Course web pages:	Most course material will be available on Coursera. Go to your course page on Blackboard for a link. (If you have a Coursera account separate from this course, you may get errors if you are logged on to it, so log off first.)	
Classroom sessions:	Mondays 10:10-12:00 in OI 2212 (no class on Monday, October 14 and Monday, November 10) Wednesdays 10:10-11:00 in LM 161	Tuesdays 11:10–12:00 in MS 2158 (no class on Tuesday, November 11) Thursdays 11:10-13:00 in LM 159

How will these sections of the course operate?

See the document titled "Course flow".

Course content

This course will provide an intuitive introduction to fundamental statistical concepts and reasoning. Students will become acquainted with the full process of inquiry and evaluation used in investigations in a wide range of areas in environmental or health and life sciences. In particular, 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:

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, 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.

SIMPLE LINEAR REGRESSION
: Method of least squares, evaluating model fit, the effects of outliers and influential observations.

Textbooks

REQUIRED:

OpenIntro Statistics, second edition, by David M. Diez, Christopher D. Barr, and Mine Çetinkaya-Rundel. This text can be downloaded as a PDF document free-of-charge at `http://www.openintro.org/stat/textbook.php`. Each week, we will provide the sections in the book that are relevant to the material being covered. Recommended problems for those who want additional practice will be given from this book.

OPTIONAL:

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. This textbook is available at the University of Toronto bookstore. It is extremely easy to read and is written in a conversational style. It is highly recommended for students who are looking for that approach to the course material. Each week, we will provide the sections in the book that are relevant to the material being covered. Please note that for these sections of the course, there is no need to purchase Minitab software nor the Minitab workbook.

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.

Additional help

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

- For continued class discussion and questions outside of class, try posting on the Coursera discussion forums. The instructor will be monitoring them regularly.
- You can visit your instructor or the teaching assistants during their office hours.
- There is a drop-in Statistics Aid Centre in New College: Wetmore Hall 68A. See `http://www.utstat.toronto.edu/wordpress/?page_id=154` for the schedule.
- E-mail should only be used for emergencies or personal matters.

Evaluation

	Weight	Date	Time	Location
Weekly quizzes	15%	Sundays (except the week of the term test)	Submit by 23:59	Online (Coursera)
Term test	35%	Section L0201: Monday, October 21 Section L0301: Thursday, October 24	10:10-12:00 11:10-13:00	TBA TBA
Exam	50%	Scheduled by Faculty of Arts and Science		

Adjustment to marking scheme for those who do better on the final exam:
If your exam mark is better than your test mark, the exam weight will be 70% and the test weight will be 15%.

Weekly online quizzes:
By each Sunday at 23:59, you must complete an online quiz on Coursera covering the 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 highest score will count. Note that you will get a different randomly generated quiz each time.

Term test and exam:
The test will be written during class time but in a room other than the usual classroom (location to be announced).

Although the test and exam will place a very minor emphasis on formulæ, you are allowed a one-sided 8-1/2"x 11" (standard letter size) hand-written aid sheet on the term test and a two-sided hand-written aid sheet on the final exam.

You must bring your student identification to the term test and the final exam.

Missed Tests:
If a test is missed for a valid reason, you must submit the University of Toronto Student Medical Certificate, completed by your doctor, to your instructor within one week of the test. Print on it your name, student number, and date. If documentation is not received in time, your test mark will be zero. If a test is missed for a valid reason, its weight will be shifted to the final exam.

Marking concerns:
Any requests to have marked work re-evaluated must be made *in writing* within two weeks of the date the work was returned to the class. 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?*

  should be posted on the discussion forums on Coursera. Questions can be posted anonymously (so that the author is anonymous to other students but not to the instructors), if desired.
- For private communication, such as:
  - *I missed the test because I was ill.*

  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 classroom, or course materials, please contact Accessibility Services as soon as possible: `accessibility.services@utoronto.ca` or `http://accessibility.utoronto.ca`.

Your responsibilities

The classroom sessions for these sections of the course are designed to actively engage you in the course material. We hope you'll find them interesting, challenging, and fun, and an excellent opportunity to truly learn the material. In order for these sessions to be effective, coming prepared, by learning about the week's concepts through the videos or textbooks, is essential.