DEPARTMENT OF MATHEMATICAL AND COMPUTATIONAL SCIENCES
UNIVERSITY OF TORONTO MISSISSAUGA

STA215H5F LEC0101
Introduction to Applied Statistics
Course Outline - Fall 2019

Class Location & Time	Mon, 11:00 AM - 01:00 PM IB 120 Wed, 11:00 AM - 12:00 PM IB 120
Instructor	Ramya Thinniyam
Office Location	DH 3033
Office Hours	Mon 2-4pm, Wed 1-3pm, or by appointment (may change during test weeks)
Telephone	905-828-3804
E-mail Address	ramya.thinniyam@utoronto.ca
Course Web Site	https://q.utoronto.ca
Co-Instructor	Alison Weir
Office Location	DH 3036
Office Hours	Mon 12:30-2:30, Wed 10:30-12:30, or by appointment (may change during test weeks)
E-mail Address	alison.weir@utoronto.ca

Course Description

This course introduces the basic concepts, logic, and issues that form statistical reasoning. Topics include descriptive statistics, exploratory data analysis, elementary probability, sampling distributions, point and interval estimation, hypothesis testing for normal and binomial data, and regression analysis. [36L, 12T]

Exclusion: STA218H5, STA220H5, STA256H5, STA257H5; STAB22H5; ECO220Y5, ECO227Y5; PSY201H5; PSYB07H3; SOC350H5 (SCI)
Distribution Requirement: SCI

Students who lack a pre/co-requisite can be removed at any time unless they have received an explicit waiver from the department. The waiver form can be downloaded from here.

Learning Outcomes

Coure Objectives:

- Differentiate between inferential and descriptive statistics.
- Summarize sample data to obtain information about the population; explain potential problems with, and limitations of, such extrapolations.
- Calculate probabilities of events and compound events for discrete sample spaces.
- Determine if events are independent
- Know how to assess the assumption of independence and know that the methodologies in this course apply only under the condition of independent observations.
- Know the common structure of classical statistical hypothesis testing.
- Construct hypothesis tests for one mean and one proportion, and for the equality of two means, and two proportions.
- Interpret a confidence interval.
- Construct confidence intervals for one mean and one proportion, and for the difference between two means, and two proportions.
- Interpret and calculate a Pearson's coefficient of correlation.
- Fit a simple linear regression model, use the model, and assess the fit of the model.
- Use R software, and interpret R output, to conduct the analyses listed above.

Textbooks and Other Materials

Required

1. Statistics by Learning Objective, online book

A token to activate the online book is available in the bookstore, ISBN 978-1-337-68758-4.

1. R and RStudio statistical software

Free, download from https://www.r-project.org/.

1. Top Hat classroom response system

You will be emailed an invitation to sign up for this service.

Supplementary

1. Stats Data and Models, by DeVeaux, Velleman and Bock
2. Introduction to the Practice of Statistics, by Moore and McCabe

Assessment and Deadlines

Type	Description	Due Date	Weight
Term Test	Term Test #1	2019-10-07	20%
Term Test	Term Test #2	2019-11-18	20%
Quiz	Top Hat and Lecture Participation	On-going	10%
Assignment	Online, assessed throughout WebAssign	On-going	10%
Final Exam		TBA	40%
		Total	100%

More Details for Assessment and Deadlines

***Term Tests*:**
The term tests will be held from 7:10pm-8:40pm on the test dates. There is no extra time for late entrants. Tests may be in a different room from the lecture room - locations will be announced on Quercus. You will be required to bring some data analysis from R/RStudio to each test.
NOTE:** The ***tests are held outside of the lecture times so that students from all lecture sections can write the SAME test at the SAME time. Test dates/times were generated by the timetable-machine, selecting times when all registered students are free.*
The final exam is comprehensive. Your test solutions may be photocopied before being returned to you.

***Top Hat and Lecture Participation*:**
Top Hat is an, in class, online learning tool. The instructor asks questions on the lecture slides and you respond using your phone, ipad, laptop, or any other device with an internet connection. There will be one or two questions in each lecture - ***you must attend and answer in your registered lecture section*** to earn marks. About half of your Top Hat marks are for participation (just answering the questions) and about half are for answering correctly. You're allowed to miss responding to five questions without any penalty: if n questions are asked, your mark will be calculated out of $(n-5)$. No other adjustments will be made for missed questions. *There are no exceptions to this policy.*
Information on how to register for Top Hat will be sent to you by email.

Assignments:
There are 3 assignments consisting of WebAssign questions. All of these assignments are completed online. Assignments will be posted on WebAssign one week before each due date. These problems are machine marked.
Note: In addition to the marked assignments, additional WebAssign problems will be posted for practice. These will not be marked.
Assignments are due on Sept 22nd, Oct 20th, and Dec 1st by 11:59pm sharp and late assignments are not accepted.

Data Anaysis:
Some of the homework questions may be assigned to be done using 'R'. Solutions must be completed individually. For each question in the data analysis assignments, you will be asked to ***re-label one of the variables with your surname***. If you don't do this, your assignment will not be accepted. **You may not alter the output (by typing or handwriting anything)** If you do not follow these rules, your submission will not be accepted. You may be asked to submit some of these problems with your term tests or use the output to answer questions.

Penalties for Lateness

Late homework and late quizzes are not accepted. This is not negotiable.

Procedures and Rules

Missed Term Work

Missed Test Policy:

If you miss a test for medical reasons, submit a ***UofT medical certificate indicating that that you saw the doctor on the date of the missed test and that you were unable to function***. If you miss a term test for any other reason, submit appropriate official documentation. Also ***include your full name, student number, course number, lecture section, and the missed Test Number at the top of the page*** *(Name, Student Number, STA215 Fall 2019 L0101, Missed Test #1, etc).* Documentation must be submitted to the instructor in person within one week of the missed test. All documentation should be official and written in English. The professor determines if the absence is legitimate and is entitled to refuse your documentation if it does not meet these standards. Examples of unacceptable reasons for missing a test are: automotive breakdown, transportation problems, social or other extra-curricular activities, etc. If UTM is officially open, weather is a valid excuse only if more than 50% of the class miss the test.
Make-up tests will not be scheduled for missed tests; the missing scores will be substituted with your exam. If your documentation is not received on time, your test mark will be zero.

Late Assignment Policy:

Late submission of assignments are not accepted. This is not negotiable.

Missed Top Hat Quizzes:

Missed Top Hat questions receive a mark of 0. You're allowed to miss responding to five questions without any penalty: if *n* questions are asked, your mark will be calculated out of *(n-5)*. No other adjustments will be made for missed questions. *There are no exceptions to this policy.*

Test Remark Policy:

Requests for test remarking must be made in writing. Submit a note to the instructor explaining why you believe your solution(s) deserve more marks. Submit this note and your marked test *during the tutorial when tests are returned to you.* Your TA will give your remark request to the professor. *Late remark requests will not be accepted. Remark requests without justification will not be considered. Remark decisions are made by the instructor (not TAs).* Note: original test solutions may be photocopied before being returned to you.

Missed Final Exam

Students who cannot write a final examination due to illness or other serious causes must file an online petition **within 72 hours of the missed examination**. Original supporting documentation must also be submitted to the Office of the Registrar **within 72 hours of the missed exam**. Late petitions will **NOT** be considered. If illness is cited as the reason for a deferred exam request, a U of T Verification of Student Illness or Injury Form must show that you were **examined and diagnosed at the time of illness and on the date of the exam, or by the day after at the latest**. Students must also record their absence on ACORN on the day of the missed exam or by the day after at the latest. Upon approval of a deferred exam request, a non-refundable fee of $70 is required for each examination approved.

Academic Integrity

Honesty and fairness are fundamental to the University of Toronto's mission. Plagiarism is a form of academic fraud and is treated very seriously. The work that you submit must be your own and cannot contain anyone elses work or ideas without proper attribution. You are expected to read the handout How not to plagiarize (http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize) and to be familiar with the Code of behaviour on academic matters, which is linked from the UTM calendar under the link Codes and policies.

Academic Integrity:

To maintain academic integrity, members of the University of Toronto community are expected to promote honesty, fairness, respect and responsibility. The Academic Regulations of the University are outlined in the Code of Behaviour on Academic Matters , and you must follow this code - cheaters will be prosecuted. You are expected to be familiar with, and to abide by, all components of the Code of Behaviour on Academic Matters. Full details can be found online at http://www.governingcouncil.utoronto.ca/policies/behaveac.htm

Final Exam Information

Duration:	3 hours
	Non-Programmable Calculators
Aids Permitted:	1 page(s) of double-sided Letter (8-1/2 x 11) sheet
	Statistical Table

Additional Information

Tutorials and TAs:
TA contact info and office hours will be posted on Quercus.

Tutorials begin the week of September 16th. Tutorials will be used for your TA to review topics, take up homework problems, and help with computing.
Tutorials will be held every week except during test weeks.

Email Policy:
Email is most appropriate for personal questions. In general, we are unable to answer technical questions about the course material by e-mail. Before you send an e-mail, make sure that you are not asking for information that is already on the course outline/ website/announcements, or questions about the course material that are more appropriately discussed during office hours. If you do not get a response, this may be why. If your question is conceptual and does not require calculations or an elaborate answer, you can ask by email.

Any questions regarding the tutorials should be addressed to your TA. For all other matters, contact the instructor. Please email the instructor and TAs using your *@utoronto.ca address. The **subject line should contain the course number, lecture section number, and a relevant subject (indicating what the email is about)**. Be sure to **include your full name and student number in the body** of the message. You will not get a response if you email from other email addresses or do not follow the email policy.

Student Responsibilities:

- It's up to you to know all course policies and important dates - read the course outline. It's up to you to know about any important announcements - these will come to your inbox. Check Quercus regularly! Check your *@utoronto.ca inbox regularly!
- You're responsible for your own learning. We're happy to help you learn, but in the end it's up to you! Use office hours early, and use them often. Make an appointment with the professor. Keep asking questions until you're satisfied. Ask about big concepts or small details - there is no such thing as a stupid question! Always take advantage of extra help - don't wait until it's too late!
- You must to follow the U of T code of Behaviour.

What you get out of the course depends on what you put into the course!

Instructor Responsibilities:

Lectures will be clearly presented, organized, and have plenty of examples.

- Extra help, remedial and acceleration, is always available - in office hours, by appointment, and by email.
- Your emails will be answered in a timely fashion.
- Every student in the class will be treated with fairness and respect. Students who wish to excel are encouraged to consult regularly with the instructor. Students who abuse the U of T code of behavior will be dealt with appropriately.
- The lecturers works closely with your TAs. TAs are trained to offer quality tutorials and mark all work consistently and fairly.

Approximate Lecture Schedule:

Elements of the course schedule may be subject to change.

- Material coverage in each may be revised due to time availability. Any changes will be promptly updated on Quercus.

Lectures	*Topics*	*Textbook Sections*
1, 2	Introduction; Populations and samples; Parameters and statistics	1.1A - 1.5A
3, 4	Numeric data summaries of location and spread; introducing R	4.1B, 4.3A, supplement
5, 6	Graphical data summaries: histograms and boxplots	6.1A, 6.3E, 6.3F, supplement
7-9	Probability and independence	7.1A, 7.1B, 7.1E - 7.1J, supplement
10, 11	The Normal distribution	12.2A - 12.2J
12	The t-distribution	13.1A, 13.1B
13 - 15	Central Limit Theorem, distributions of: sample mean, sample proportion, difference between two sample means, difference between two sample proportions	14.1A - 14.1C, 14.2A - 14.2C, 14.3A - 14.3C, supplement
16, 17	Confidence intervals for one population mean and for one population proportion, sample size selection	15.1A - 15.1C, 15.2A - 15.2C
18 - 20	Confidence intervals for the difference between two population means and for the difference between two population proportions	16.1A, 16.1B, 16.2A, 16.2B, 16.3A, 16.3B
21 - 24	Hypothesis tests for one population mean and for one population proportion	17.1A - 17.1E, 17.1H, 17.2A - 17.2D
25, 26	Hypothesis tests for equality of two population means and for equality of two population proportions	18.1A, 18.1B, 18.2A, 18.2B, 18.3A, 18.3B
27 - 32	Correlation and simple linear regression	20.1A, 20.1B, 20.2A, 20.2B, 20.3A - 20.3C, 20.3E - 20.3G

- Each hour is considered one lecture.
- Test 1 will cover Lectures 1-12 inclusive.
- Test 2 will cover Lectures 13-26 inclusive.
- Test coverage may change according to lecture coverage.

Last Date to drop course from Academic Record and GPA is November 7, 2019.