DEPARTMENT OF MATHEMATICAL AND COMPUTATIONAL SCIENCES
UNIVERSITY OF TORONTO MISSISSAUGA

STA304H5F LEC0101
Surveys, Sampling and Observational Data
Course Outline - Fall 2019

Class Location & Time	Mon, 02:00 PM - 04:00 PM DV 2082 Wed, 02:00 PM - 03:00 PM DV 2082
Instructor	Luai Al Labadi
Office Location	DH-3072
Office Hours	Mon. & Wed.: 12:30-1:30; Tues. & Thur.: 11:30-12:30; By appointment
E-mail Address	luai.allabadi@utoronto.ca
Course Web Site	https://q.utoronto.ca
Teaching Assistant	Karan Agarwal
Office Location	TBA on Quercus
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E-mail Address	karan.agarwal@mail.utoronto.ca
Teaching Assistant	Misha Ali
Office Location	TBA on Quercus
Office Hours	TBA on Quercus
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Course Description

The sample survey is a widely used technique for obtaining information about a large population at relatively small cost. Only probability samples can provide both an estimator and a measure of sampling error from the data itself. In addition to sampling error, non-sampling errors (refusals, not-at-home, lies, inaccuracies, etc.) are always present, and can produce serious biases. The course covers: design of surveys, sources of bias, randomized response surveys. Techniques of sampling; stratification, clustering, unequal probability selection. Sampling inference, estimates of population mean and variances, ratio estimation, observational data; correlation vs. causation, missing data, sources of bias. [36L, 12T]

Prerequisite: STA107H5/256H5/257H5/ECO227Y5
Exclusion: STA304H1 (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.

Textbooks and Other Materials

Required Textbook

- *Elementary Survey Sampling, 7th edition*, by Scheaffer, Mendenhall, Ott & Gerow, publisher Cengage, ISBN-10: 0840053614 | ISBN-13: 9780840053619

Additional References

- *Sampling: Design and Analysis, 2nd edition,* by Sharon L. Lohr, publisher Cengage, ISBN 9780495105275
- *Complex Surveys: A Guide to Analysis Using R*, by Lumley, Wiley ISBN 978-0-470-28430-8

Assessment and Deadlines

Type	Description	Due Date	Weight
Term Test		2019-10-21	24%

Other	Project (see below for more details)	2019-11-25	26%
Class Participation	Top Hat Quizzes		10%
Final Exam	TBA	TBA	40%
		Total	100%

Penalties for Lateness

Late assignments/projects are not accepted except in the case of an official Student Medical Certificate or a written (not email) request submitted at least one week before the due date and approved by the instructor. **More details are given in Additional Information below.**

Procedures and Rules

Missed Term Work

To request special consideration, bring supporting documentation to the instructor in person during office hours at least one week in advance.

In case of illness, bring a U of T medical certificate to the instructor within one week of the missed work. The certificate must specify the exact period during which you were unable to carry out your academic work.

There are no make-up tests. The weight of the midterm will be shifted to the final exam.

Missed Final Exam

Students who cannot write a final examination due to illness or other serious causes must file anonline 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.

Final Exam Information

Duration: 3 hours
Aids Permitted: Non-Programmable Calculators

Additional Information

Midterm Test

The midterm test is held in the lecture room and runs from 2:15 to 3:30 pm (75 minutes). There is no extra time for late entrants. Test solutions may be photocopied before they are returned.

Missed Test Policy

If you miss the midterm test -

- Due to illness or unforeseen emergency:
  - Bring a U of T medical certificate to the instructor within one week of the missed work. The certificate must specify the exact period during which you were unable to carry out your academic work.

OR

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    - Bring police reports, death certificates, etc. to the instructor within one week of the missed work. The documentation must clearly indicate your unavailability during the time of the test.
- For reasons you know about in advance of the test: Bring supporting documentation to the instructor at least one week in advance.
- ***Include your full name, student number, course number, the missed assessment at the top of the page*** *(Name, Student Number, STA304, Missed Midterm Test, etc).*
- All documentation must be presented, to the professor, not the TA.
- Documentation must be submitted to the instructor **within one week** of the missed test. *Late documentation will not be accepted.*
- 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.
- If your absence is classified as legitimate, the missing score will be weighted based on the final exam. That is, the midterm exam will be the final exam mark times (24/40). *A makeup test WILL NOT be scheduled.* If your documentation is not received on time, your test mark will be zero.

Test Re-Mark Policy

- Tests will be returned in tutorials. Requests for remarking must be made in writing and submitted to the TA before the end of the tutorial in which the tests are returned.
- *Late remark requests will not be accepted.*
- Requests must explain *why* you believe your solution(s) deserve more marks. If you write *"remark Q2a",* your request will not be considered.
- Remark decisions are made by the instructor, not the TA.

Course Project

The course project has a number of learning objectives:

- How to communicate statistical conclusions to non-statisticians, written and spoken.
- How to write a technical report.
- How to work effectively as a member of a team.
- How to learn new statistical methodologies without classroom instruction (optional, but necessary for top marks).
- How to write a good questionnaire question (dependent on your topic).

Groups of about six students complete each project, all project topics must be different, and your progress is monitored through a series of assignments/reports. You may be required to re-submit a revised version of an assignment/report. The final results are presented in class, and the presentations are evaluated by your peers. All submissions are electronic and will be assessed using *Turnitin*. Plagiarism will be dealt with seriously. **A complete description of the course project is available in a separate file on Quercus**.

Project Evaluation

Group definition	16 September	1%
Proposal	30 September	2%
Progress report, data set	28 October	3%
Progress report, technical	11 November	5%
Final report	25 November	10%

Presentation	Nov 27- Dec 4	5%

Late Assignment/Report Policy

Late assignments/projects are not accepted except in the case of an official Student Medical Certificate or a written (not email) request submitted at least one week before the due date and approved by the instructor.

Top Hat Quizzes

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 Top Hat questions in each lecture. Each question is marked out of 1, with 0.5 marks for simply entering any answer and 0.5 marks for entering the correct answer. That is, about half of your Top Hat marks are for participation (just answering the questions) and about half are for answering correctly. You must ***attend and answer in your registered lecture section to earn marks***.

How to Register for Top Hat?

- You'll receive an email letting you know how to set up your account and how to pay your small Top Hat fee.
- When you register for Top Hat, you must: ***Use your U of T student number, your @mail.utoronto.ca email address, your first and last name as it appears on ROSI/ACORN.***
- *If you use a different email address or do not enter the above information as required, your Top Hat marks will not be counted.*
- More information on how to register for Top Hat will be sent to you by email and posted on Quercus.

Missed Quiz Policy

You're allowed to miss responding to three questions; if n questions are asked your mark will be calculated out of $n-3$. No other adjustments will be made for missed quizzes. *There are no exceptions to this policy.*

If you do not have a device for answering, or if the Top Hat fee is beyond your means, please see the instructor to discuss your situation on or before September 13th.

Approximate Lecture Schedule

This schedule is subject to change. Updates will be announced in lectures and posted in the Quercus.

Lecture #	Date	Topic	Text Reference
1	9-Sep	definitions & sample design	2.1-2.3
2	9-Sep	sources of error	2.4
3	11-Sep	questionnaires & planning	2.5-2.6
4	16-Sep	infinite population summary statistics	3.1-3.2
5	16-Sep	finite population summary statistics	3.3
6	18-Sep	sampling distributions, correlation & estimation	3.4-3.6

7	23-Sep	simple random sampling & estimation of a mean/total	4.1-4.3
8	23-Sep	sample size, estimation of a proportion & comparing estimates	4.4-4.6
9	25-Sep	stratified random sampling & estimation of a mean/total	5.1-5.3
10	30-Sep	selecting & allocating sample sizes	5.4-5.5
11	30-Sep	estimating a proportion, and selecting & allocating sample sizes for proportions	5.6-5.7
12	1-Oct	optimal stratification	5.8-5.9
13	7-Oct	double stratification	5.10-5.11
14	7-Oct	ratio estimation	6.1-6.3
15	9-Oct	selecting sample size	6.4
16	**21-Oct**	**Midterm**	
17	23-Oct	stratified, regression & difference ratio estimation	6.5-6.7
18	28-Oct	relative efficiency of estimators	6.8
19	28-Oct	systematic sampling & estimation of a mean/total	7.1-7.3
20	30-Oct	estimating a proportion, and selecting sample size & repeated systematic sampling	7.4-7.6
21	4-Nov	comments on variances	7.7
22	4-Nov	cluster sampling & estimation of a mean/total	8.1-8.3
23	6-Nov	equal cluster sizes	8.4
24	11-Nov	selecting sample size & estimating a proportion	8.5-8.7
25	11-Nov	probabilities proportional to size	8.9
26	13-Nov	two stage cluster sampling & estimation of a mean/total	9.1-9.3
27	18-Nov	ratio estimation of a mean, estimating a proportion	9.4-9.5
28	18-Nov	equal sized clusters & probability proportional to size	9.6-9.7
29	20-Nov	estimating a population size - direct	10.1-10.2
30	25-Nov	estimating a population size - inverse	10.3
31	25-Nov	sample size for estimating population size	10.4
32	27-Nov	project presentations	
33	2-Dec	project presentations	
34	2-Dec	project presentations	

35	4-Dec	project presentations & review	

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