University of Toronto
Department of Statistical Sciences
STA261H1S – Probability and Statistics II

Winter 2017

Lectures: Mondays 3:10 – 5 p.m. in MS 2158 and Wednesdays 3:10 – 4 p.m. in PB B150 (L0101)
Wednesdays 7:10 – 10 p.m. in WB 116 (L5101)

Instructor: Dr. Ofir Harari

Email: ofir.harari@utoronto.ca

Web-page: The website for this course is hosted on Blackboard. A university ID and a password are required to access Blackboard courses.

Office: Sidney Smith Hall room 6027.

Office hours: Tuesdays 10:10-11:00, Wednesdays 17:10-18:00 and Fridays 10:10-11:00.

Course Description

This course is a sequel to STA257H1 providing an introduction to current statistical theory and methodology. Topics include: statistical models, parameters, samples and estimates, hypothesis testing, and confidence intervals; unbiasedness, sufficiency, the likelihood function and its applications, basics of data analysis; time permitting: simple linear and generalized linear models.

Textbook

The textbook is John A. Rice, *Mathematical Statistics and Data Analysis*, 3nd edition.

Additional References:

Probability and Statistics, The Science of Uncertainty by Evans and Rosenthal.

Statistical Theory: A Concise Introduction, Abramovich, F. and Ritov, Y.

Evaluation

The grading scheme is the following (test date is tentative and might be changed):

Weekly Quizzes during Tutorials	20%
Term Test to be held on **Monday, February 13, 3-5 pm (L0101)**	30%
Wednesday, February 15, 7-9 pm (L5101)	
Final Exam	50%

Tutorials and quizzes

Tutorials start on Wednesday, January 18, and will take place every Wednesday. Please make sure you attend to the tutorial you have been assigned to! There will be a short quiz at the end of every Tutorial. There are ten quizzes; your best eight quiz marks are averaged for 20% of the final grade.

L5101

TA Name	Group	Email	Office Hours
Xiucai Ding	5101	xiucai.ding@mail.utoronto.ca	Wednesdays Jan 18-Feb 6, 1-2 pm
Timothy Jungsung Park	5102	timothy.park@mail.utoronto.ca	
Arvind Vijay Shrivats	5103	arvind.shrivats@gmail.com	Thursdays Mar 2-23, 11 am-12 pm
Hua Jie (Jacky) Li	5104	jackylica@gmail.com	Friday Mar 31, 12-2 pm
Aaron Xin Situ	5105	aaronx.situ@mail.utoronto.ca	Thursday Mar 30, 12-2 pm
Jia Wen Tian	5106	jiawen.tian@mail.utoronto.ca	Monday Mar 27, 11:00-12:30 Friday Mar 31, 11:00-12:00

L0101

TA Name	Group	Email	Office Hours
Yeming (Ethan) Wen	0101	ethan.wen@mail.utoronto.ca	Fridays Jan 20-Feb 10, 1-2 pm
Peiliang Guo	0102	leo.guo@mail.utoronto.ca	Friday Mar 31, 12-3 pm
Taiyan Liu	0103	taiyan.liu@mail.utoronto.ca	Wednesdays Mar 1-20, 5-6 pm
Jun Ouyang	0104	jun.ouyang@mail.utoronto.ca	Wednesday Mar 20, 12-2:30 pm
Xinyi Zhang	0105	xyi.zhang@mail.utoronto.ca	Friday Feb 10, 12-1 pm
Yang Guan Jian Guo	0106	ygj.guo@mail.utoronto.ca	Wednesdays Mar 8-29, 12-1 pm
Yiqi Shi	0107	shane.shi@mail.utoronto.ca	Thursdays Jan 19-Feb 2, 3-4 pm
Bingchen Shan	0108	bingchen.shan@mail.utoronto.ca	Friday Mar 31, 12-1 pm

Practice Problems

Practice problems will be assigned weekly and will be posted on the course Blackboard. They are **not** to be handed in. They will be appropriate preparation for the tutorial discussion and quiz.

Important Notes

- The term test will be held on **Wednesday, February 13/15** and will cover all the material in lectures up to that time. It will be closed book with no aids allowed beside a nonprogrammable calculator; a formula sheet will be provided.

- If the test is missed for a valid reason, you must submit appropriate documentation to the course Instructor (Ofir Harari) or the Departmental Office (SS6018) within one week of the test. Print on it your name, student number, course number and date. If documentation is not received in time, your test mark will be zero. If the test is missed for a valid reason, its weight will be shifted to the final exam.

- Important announcements, additional examples, past tests/exams and other course info will be posted on the course web-page. Check it regularly.

- The lecturer and TA's are there to help. Ask questions! If you have any comments or suggestions about the course, please tell us. If you become aware of any problems, mention this to your instructor right away.

Academic Integrity Policy

All work submitted for credit must be your own individual effort.

University of Toronto's academic integrity policy states that "Honesty and fairness are considered fundamental values shared by students, staff and faculty at the University of Toronto. The University's policies and procedures that deal with cases of cheating and plagiarism are designed to protect the integrity of the institution. As a result, the University treats cases of cheating and plagiarism very seriously. Any student accused of committing an academic offence will find that the accusation is dealt with formally and that the penalties can be severe if it is determined that they did, in fact, cheat." (http://academicintegrity.utoronto.ca/)

Tentative Course Schedule

Week	Topics	Readings	Tutorial Notes
Lecture 1 **Jan 9 (11)**	Course introduction, sampling distribution, important distributions	Chapter 6	**No Tutorial**
Lecture 2 **Jan 16 (18)**	Parameter estimation: method of moments, consistency, maximum likelihood estimation	8.1 – 8.5	Quiz #1 (Lecture 1)
Lecture 3 **Jan 23 (25)**	Large sample theory for maximum likelihood estimators, the Newton-Raphson algorithm	8.5.1 – 8.5.2	Quiz #2 (Lecture 2)
Lecture 4 **Jan 30 (Feb 1)**	Goodness of estimation, efficiency, the Cramér-Rao lower bound.	8.5.3, 8.7	Quiz #3 (Lecture 3)
Lecture 5 **Feb 6 (8)**	Sufficiency, exponential family, Rao-Blackwell Theorem, interval estimation.	8.8	Quiz #4 (Lecture 4)
Feb 13/15 – Midterm, no tutorials **(Lectures 1 to 5)**		
Reading week		
Lecture 6 **Feb 27 (Mar 1)**	Hypothesis testing	9.1 – 9.3	Quiz #5 (Lecture 5)
Lecture 7 **Mar 6 (8)**	Likelihood ratio test and generalized likelihood ratio tests	9.4	Quiz #6 (Lecture 6)
Lecture 8 **Mar 13 (15)**	Likelihood ratio tests for multinomial, Pearson's goodness-of-fit test	9.5 – 9.6	Quiz #7 (Lecture 7)
Lecture 9 **Mar 20 (22)**	Fisher's exact test, chi-square test of independence, Matched-pairs designs & McNemar's test	13.1 – 13.5	Quiz #8 (Lecture 8)
Lecture 10 **Mar 27 (29)**	Simple linear regression	14.1 – 14.2	Quiz #9 (Lecture 9)
Lecture 11 **Apr 3 (5)**	TBD		Quiz #10 (Lecture 10)