2015 Summer - STA261H1S - Probability and Statistics II

Lectures: Monday and Wednesday 7 - 10 p.m in LM162
Tutorials: Monday and Wednesday 6 - 7 p.m

Instructor: Zihao Yan
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Course Website: portal.utoronto.ca
Instructor Office Hour: Monday 10 a.m - 12 p.m (SS6025)
TA Office Hour: TBA (SS1091)

Course Description: A sequel to STA257H1, providing a rigorous introduction to the logical foundations of statistical inference and the practical methodology engendered. Topics include: statistical models, parameters, samples and estimates; the general concept of statistical confidence with applications to the discrete case and the construction of confidence intervals and more general regions in both the univariate and vector-valued cases; hypothesis testing; the likelihood function and its applications; time permitting: the basics of data analysis, unbiasedness, sufficiency, linear models and regression
Prerequisite(s): STA257

Text(s): *Mathematical Statistics with Applications* , 7th Edition
Author(s): Wackerly, Mendenhall and Scheaffer

Academic Integrity: You are expected to follow the University of Torontos Code of Behaviour on Academic Matters. See http://www.utoronto.ca/academicintegrity/. I have zero tolerance on academic misconducts.

Grading Scheme

- 20 % quizzes (4% each)

- 30 % Midterm

- 50 % Final Exam

Important Dates

- July 1st, Canada Day, No Class

- July 20th, Midterm

- July 27th, Drop Deadline

- Aug 3rd, Civic Day, No Class

Quizzes:

There will be 5 quizzes worth 4% each on every Wednesday tutorial. If missed due to reasonable excuses, whether there are make-up quizzes depends on TA.

Midterm and Final:

There will be one midterm (2-hour) and one final (3-hour) exam. Both will be closed book exams. The midterm will be held during the lecture time on **Monday, July 20th, 2015 from 7pm 9pm. Location to be announced**. There will be **no** make-up midterm. If missed due to a legitimate reason, proper documentation must be provided to the instructor and the weight will be transferred to the final exam. The final exam date will be scheduled by the registrar during the final exam period and will be announced. The final exam will be a cumulative exam covering material from the entire course.

Grading Questions

Grading questions for tests should be brought in person to the instructor within one week of the test being returned.

Tentative Course Outline:
The weekly coverage might change as it depends on the progress of the class.

Lecture	Content
Lec 1, June 29	• Introduction • Types of Convergences, WLLN and CLT
Lec 2, July 6th	• Statistical Model and Inference • Method of Moment Estimator
Lec 3, July 8th	• Confidence Interval • Likelihood Function, Sufficiency and Minimal Sufficiency
Lec 4, July 13th	• Maximum Likelihood Estimator • Rao-Blackwell Theorem • Complete Statistic, Ancillary Statistic • Lehmann-Scheffe Lemma
Lec 5, July 15th	• Exponential family model and its properties • Score function and fisher information
Midterm, July 20th	
Lec 6, July 22nd	• Likelihood Asymptotic and Delta Method • Cramer-Rao lower bound
Lec 7, July 27th	• Intro to Hypothesis Testing
Lec 8, July 29th	• Neyman-Pearson Lemma • Likelihood Ratio Test
Lec 9, Aug 5th	• P-value • Relationship between Confidence Interval and Hypothesis Testing
Lec 10, Aug 10th	• Review