

## **STA261H1S – Probability and Statistics II - Winter 2015 (web site: UT Portal)**

Instructor: Jamie Stafford SS6019

Office hrs: W10am---noon

**Course Objective:** To introduce topics in statistical theory, particularly those in parameter estimation and hypothesis testing, and to prepare you for further study in Statistical Science. Coverage includes chapters 8 and 9 plus a selection of topics from chapters 10-14 of the textbook. Prerequisite: STA257

### **Tutorials**

Tutorials begin Jan 14. Tutorials meet every Wednesday 4-5pm. Tutorial rooms will be posted on the course web site prior to Jan 12. Assignments will be also posted on the course web site. They will consist of suggested exercises, mostly from the textbook. Bring your solutions to tutorial, along with your questions about these exercises or the related theory and concepts. Expect a quiz on the material as well.

### **Textbook**

Mathematical Statistics and Data Analysis – 3<sup>rd</sup> edition – by John A. Rice

### **Statistics Aid Centre (from Jan 14)**

Your primary source of help with difficulties is your TA in the scheduled tutorial, but additional assistance can be obtained at the Statistics Aid Centre, Room 2133, in Sidney Smith Hall. Check out <http://www.utstat.utoronto.ca> and click on Statistics Aid Centres, for schedule.

### **Evaluation**

Weekly tutorial quizzes 20%, Term Test 30% and Final exam: 50%. The term test is during class time on February 9<sup>th</sup>. **Programmable calculators are not permitted on quizzes, test or exam. You must bring your student identification to term tests as well as the final exam.**

### **Missed Midterm Test**

There are **no make-up tests**. Should you miss the term test due to illness, you must submit to your lecturer or to SS6018 (Stats office), within one week, completed by yourself and your doctor, **the 'U of T Student Medical Certificate'**, obtainable from your college registrar, the Office of the Faculty Registrar (SS1006), the StatSci Dept. office, or the Koffler health service. The test's weight will then be shifted to the final exam. **If proper documentation is not received, your test mark will be zero.**

### **Academic Offences**

**Academic offences are unacceptable**, and harm everyone. Offenders are caught, and **sanctions can be severe** and very with examples including a zero in the course with annotation on the transcript for several years; suspension for a year; even expulsion.

# STA 261 LM5101 – Probability & Statistics II

## Course Outline (Winter 2015)

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### Course Information

#### 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; the basics of data analysis, unbiasedness, sufficiency, linear models and regression.

#### Course Instructor

Jonathan Lee, [jonathan@utstat.toronto.edu](mailto:jonathan@utstat.toronto.edu)  
Sidney Smith 6025

#### Instructor office hours

Wednesdays 2-4pm  
Or by appointment (via e-mail)

#### TA office hours

Mondays 3-5pm  
Statistics Aid Centre (SS 1091)

#### Course webpage

Blackboard (<http://portal.utoronto.ca>)

Check frequently for announcements and updates. Lecture slides will be posted by Monday before each week.

#### Lectures

Sidney Smith room 2117  
Wednesday 7pm – 10pm

#### Tutorials

Wednesday 6pm – 7pm (starting second week of classes)  
Check Blackboard for section and location of tutorials.

#### Text

Rice, John (2007), *Mathematical Statistics and Data Analysis, Third Edition*.  
Brooks/Cole, ISBN 0-534-39942-8.

#### Academic Integrity

You are expected to follow the University of Toronto's Code of Behaviour on Academic Matters. See <http://www.utoronto.ca/academicintegrity/>.

## Evaluation

### Grading scheme

- 20% quizzes (best 4 quizzes, 5% each)
- 30% midterm
- 50% final exam

### Quizzes

There will be 5 short quizzes worth 5% each during tutorials (see course schedule). There are **no** make-up quizzes. The lowest quiz will be dropped to accommodate a missed quiz due to illness or other reasons.

### Midterm and final exam

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  
**Wednesday, February 11, 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 mid February. 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.

### Extra Help

Questions should primarily be addressed to your TAs during tutorials or office hours. The teaching assistants for this course are:

- Eric Bai, [hawkingbai@gmail.com](mailto:hawkingbai@gmail.com)
- Jun Yang, [yangjun.ee@gmail.com](mailto:yangjun.ee@gmail.com)

### E-mail

Emails about course administration should be sent to the instructor. Questions about course content should be sent to [STA261\\_L5101@utstat.toronto.edu](mailto:STA261_L5101@utstat.toronto.edu) which is monitored by the instructor and the TAs. You should expect a response to emails within 48 hours Monday-Friday.

E-mail should be used only to provide non-personal information or to ask a question that requires a brief response. For more lengthy discussions, you should raise the question during tutorial or visit during office hours.

## STA 261 L5101 Winter 2015 Course Schedule

Lecture/Date	Topic	Readings	Tutorial notes
<b>Lecture 1</b> Jan 7	Course Introduction Review	Chapters 1-6	<b>No tutorial</b>
<b>Lecture 2</b> Jan 14	Sampling distribution, method of moments, consistency, bootstrap	8.1 – 8.4	
<b>Lecture 3</b> Jan 21	Maximum likelihood estimation, log likelihood	8.5-8.5.1	Quiz #1 (Lectures 1 & 2)
<b>Lecture 4</b> Jan 28	Newton-Raphson, confidence intervals, efficiency	8.5.2-8.5.3, 8.7	
<b>Lecture 5</b> Feb 4	Sufficiency, exponential family, Rao-Blackwell theorem	8.8	Quiz #2 (Lectures 3 & 4)
<b>Feb 11 – Midterm (7-9pm), No tutorial (Lectures 1 to 5)</b>			
<b>Reading Week</b>			
<b>Lecture 6</b> Feb 25	Hypothesis testing	9.1 – 9.3	Midterm returned
<b>Lecture 7</b> Mar 4	Likelihood ratio test and Generalized likelihood ratio tests	9.4	Quiz #3 (Lectures 5 & 6)
<b>Lecture 8</b> Mar 11	Likelihood ratio tests for multinomial, Pearson's chi-square test, probability plots	9.5-9.6 9.8	
<b>Lecture 9</b> Mar 18	Fisher's exact test, Chi-squared tests	13.1-13.4	Quiz #4 (Lectures 7 & 8)
<b>Lecture 10</b> Mar 25	Matched-pair designs, McNemar's test, odds ratio	13.5-13.8	
<b>Lecture 11</b> Apr 1	Linear least squares, simple linear regression	14.1-14.3	Quiz #5 (Lectures 9 & 10)
Apr 8-30	<b>Final exam (cumulative)</b>		