STA 261 LM5101 – Probability & Statistics II
Course Outline (Winter 2015)

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
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)

Instructor office hours

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

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
- Jun Yang, yangjun.ce@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 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

<table>
<thead>
<tr>
<th>Lecture/Date</th>
<th>Topic</th>
<th>Readings</th>
<th>Tutorial notes</th>
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</thead>
<tbody>
<tr>
<td>Lecture 1 Jan 7</td>
<td>Course Introduction Review</td>
<td>Chapters 1-6</td>
<td>No tutorial</td>
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<tr>
<td>Lecture 2 Jan 14</td>
<td>Sampling distribution, method of moments, consistency, bootstrap</td>
<td>8.1 – 8.4</td>
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<tr>
<td>Lecture 3 Jan 21</td>
<td>Maximum likelihood estimation, log likelihood</td>
<td>8.5-8.5.1</td>
<td>Quiz #1 (Lectures 1 &amp; 2)</td>
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<tr>
<td>Lecture 4 Jan 28</td>
<td>Newton-Raphson, confidence intervals, efficiency</td>
<td>8.5.2-8.5.3, 8.7</td>
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<tr>
<td>Lecture 5 Feb 4</td>
<td>Sufficiency, exponential family, Rao-Blackwell theorem</td>
<td>8.8</td>
<td>Quiz #2 (Lectures 3 &amp; 4)</td>
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Feb 11 – Midterm (7-9pm), No tutorial (Lectures 1 to 5)

Reading Week

| Lecture 6 Feb 25 | Hypothesis testing | 9.1 – 9.3 | Midterm returned |
| Lecture 7 Mar 4 | Likelihood ratio test and Generalized likelihood ratio tests | 9.4 | Quiz #3 (Lectures 5 & 6) |
| Lecture 8 Mar 11 | Likelihood ratio tests for multinomial, Pearson’s chi-square test, probability plots | 9.5-9.6, 9.8 | |
| Lecture 9 Mar 18 | Fisher’s exact test, Chi-squared tests | 13.1-13.4 | Quiz #4 (Lectures 7 & 8) |
| Lecture 10 Mar 25 | Matched-pair designs, McNemar’s test, odds ratio | 13.5-13.8 | |
| Lecture 11 Apr 1 | Linear least squares, simple linear regression | 14.1-14.3 | Quiz #5 (Lectures 9 & 10) |

Apr 8-30 | Final exam (cumulative) |