PSYCH 710
Course Outline
Fall Term, 2019

The instructor and university reserve the right to modify elements of this course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

1 Contact Information

<table>
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<tr>
<th>Instructor</th>
<th>T.A.</th>
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<tbody>
<tr>
<td>Patrick Bennett</td>
<td>Lauren Smail</td>
<td>Leila Mousapour</td>
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<tr>
<td>office hour</td>
<td>By Appointment</td>
<td>T.B.A.</td>
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The website for this course is [http://www.psychology.mcmaster.ca/bennett/psy710/index.html](http://www.psychology.mcmaster.ca/bennett/psy710/index.html). Students are expected to check the website periodically during the term for announcements and course notes.

2 Course Information

This course covers statistical techniques that are commonly used in behavioural research, especially Psychology, and therefore emphasizes the use of linear models to analyze data that have been collected using balanced experimental designs. The course material is designed with the assumption that students have completed an undergraduate statistics course. A review of basic statistical concepts is provided in the Basic Statistics tutorial that can be found here: [http://www.psychology.mcmaster.ca/bennett/psy710/readings/Basic_Stats.pdf](http://www.psychology.mcmaster.ca/bennett/psy710/readings/Basic_Stats.pdf)

3 Meeting Times

The course consists of a weekly lecture, held on Tuesdays, 2:30-4:30 PM, in PC-335, and a two-hour, computer-based laboratory held on Thursdays in PC-154 at 10:30-12:30 or 12:30-2:30. Students will be assigned to one of the labs during the first lecture.

4 Statistical Laboratories

The purpose of the labs is to provide students with opportunities to work on statistical problems related to the lectures. At the beginning of each lab, students will be provided with materials that describe the lab exercises. Students are expected to complete all lab exercises, but they will not be graded. Answers to the exercises will be posted on the course website.
5 Required Textbook


6 Software

Laboratory exercises will use the statistical computing environment, R. No familiarity with R is assumed. Versions of R for Windows, OS X, and Linux can be obtained at http://cran.r-project.org/. Students are encouraged to install R on their own computers.

The following documents – which can be obtained at http://cran.r-project.org/other-docs.html – are recommended for people who are unfamiliar with R.


Finally, several website contain valuable information about how to use R. Here are a few that I’ve found useful:

- Quick-R (http://www.statmethods.net/index.html)
- R-bloggers (http://www.r-bloggers.com)

7 Grading

Grades will be based on three in-class exams administered in the statistics laboratory. The first two exams together constitute 60% of the final grade: the exam with the higher score will be given a weight of 40% and the exam with the lower score will be given a weight of 20%. The third exam, which is cumulative, constitutes 40% of the final grade. Students will have access to R, the textbook, and class notes, during exams.

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<tr>
<th>PSYCH 710 Grading:</th>
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<tr>
<td>Test 1</td>
<td>Oct 4</td>
<td>20%</td>
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<tr>
<td>Test 2</td>
<td>Nov 8</td>
<td>40%</td>
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<tr>
<td>Test 3 (cumulative)</td>
<td>Dec 13</td>
<td>40%</td>
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Missed Exams: All students must complete all three exams. If you miss an exam, it is your responsibility to contact the the instructor as soon as possible and explain why you missed the exam. If you have a valid excuse, then you will be allowed to take a make-up exam at another time (usually one week following the original exam).

8 Academic Integrity

Students are responsible for demonstrating behaviour that is honest and ethical in their academic work, and are expected to be familiar with the University’s regulations regarding academic integrity. The University’s policies on academic integrity and the student code of conduct can be found in Sections 6.1 and 6.2 in the Graduate Calendar, respectively.
9 Schedule of Lectures

The following schedule is approximate: Dates for specific lecture topics may change as we progress through the term, but every attempt will be made to keep the same dates for the tests/exams. Also, the exact reading assignments may be altered as we go through the term: please check the course website periodically. Unless noted otherwise, all readings refer to Designing experiments and analyzing data (DEAD). After week 1, students should try to complete the readings before the lectures. Not shown in the reading list are references to extensive course notes on most of the chapters covered in class. Links to the notes can be found on the course website. Finally, lab assignments will be distributed just prior to the start of each lab.

1. Sep 10: Review of statistical inference (Part 1)
   Reading:
   • The tutorial in DEAD that reviews basic statistics.
   • My notes that review null hypothesis testing.
   • Cohen, J (1994). The Earth is round ($p < .05$). American Psychologist, 49(12), 997-1003.

2. Sep 17: Review of statistical inference (Part 2)
   Reading:
   • Lakens, E. Calculating and reporting effect sizes to facilitate cumulative science: a practical primer for t-tests and ANOVAs. Frontiers in Psychology, 2013, 4, 863.

3. Sep 24: Testing hypotheses about group means in a one-way design
   Reading: DEAD (Chapter 3)

4. Oct 1: Linear Contrasts & Trend Analysis
   Reading: DEAD (Chapter 4, 149-63 & 177-80; Chapter 6, 243-259). Also read my notes on Chapter 6 (Trend Analysis).

5. Oct 8: Review & Exam 1
   Review: Oct. 8; Exam: Oct. 10


7. Oct 22: Multiple comparisons
   Reading:
   • DEAD (Chapter 5, 193-97; 200-05; 209-11; 213-18).

8. Oct 29: Factorial designs: main effects & interactions
   Reading: DEAD (Chapter 7, 275-297; & Chapter 8, 354-60)

9. Nov 5: Factorial designs: linear contrasts, simple main effects & unbalanced data
   Reading: DEAD (Chapter 7, 297-309)

10. Nov. 12: Review & Exam 2 Review: Nov. 12; Test, Nov. 14

11. Nov 19: Designs with covariates
   Reading: DEAD (Chapter 9, 399-428)

12. Nov 26: Designs with random or nested factors
   Reading: DEAD: Chapter 10 (469-481; 494-507) & Chapter 11 (pp. 525-50; 563-67)

13. Dec 3: Higher-order within-subject designs
   Reading: DEAD (Chapter 12, 573-82 & 592-605)

14. Dec 10: Review & Exam 3
   Review: Dec. 10; Exam: Dec. 12