Faculty of Science Course Syllabus
Department of Psychology and Neuroscience

3502
Statistical Methods II
winter term 2015/16

Instructor: John Christie john.christie@dal.ca room 2519, M 1:30-3:30
TA: Mike Lawrence mike.lawrence@dal.ca room 5231, T 12:00-13:00; W 12:00-13:00
TA: Kyle Roddick kyle.roddick@dal.ca room 5225, R 12:00-14:00
Lectures: TR 10:05-11:25 Dunn 304
Tutorials: MWF 13:35-14:25

Course Description
This course is the continuation of PSYO 2501.03, with the examination of more complex, but commonly used, inferential statistics. Topics include factorial ANOVA, ANCOVA, and multiple regression. This course is intended primarily for Honours students in Psychology or Neuroscience. Class work includes computer-based assignments.

Course Prerequisites

grade of B or better in PSYO 2000.03 or NESC 2007.03, and PSYO 2501.03 or STAT 2080.03, or instructor's consent

Course Objectives/Learning Outcomes

"The main goal [of this course] is self-actualization through the empowerment of claiming your education"—UCSC professor Marc Mangel's calculus syllabus

1. Assess the quality of data and experimental hypotheses and design for the purpose of guiding an analysis plan.
2. Examine and visualize data for the purpose of extracting meaning from it.
3. Collect, analyze, interpret, and report data using appropriate statistical strategies to address various research questions and hypotheses.
4. Use statistics to develop, and defend, as well as criticize arguments.
5. Increase understanding of new statistical analysis techniques through structured trial and error, and simulation of possible data and outcomes.
6. Use information ethically and responsibly by avoiding common pitfalls that distort statistical results.
7. Demonstrate proficiency in the use of R statistics software for basic analysis, simulation, and most importantly as a learning tool.

8. Critically assess statistical techniques.

Course Materials

The assignments and readings will be posted as announcements on the course blackboard site. There is no official textbook for the course and it is suggested that you use the one from your PSYO 2501 or STAT 2080 course. If you want a book The Cartoon Guide to Statistics is very useful and inexpensive to obtain online.

Course Assessment

The class uses a levelling system to attain a grade. There are no tests or exams of any kind but there are 10 assignments. For most assignments you cannot submit them until all ones prior to them are passed. All written assignments are pass or not yet (i.e., if you don't pass you can revise until you do). If you receive a "not yet" grade on an assignment 3 times you must come see the person grading your assignment for an interview before resubmitting further. At that point you may be told that you are so far off that you cannot pass the assignment in a reasonable time and be allowed to move to the next one following a brief tutorial showing how to complete the assignment what you should have discovered. Or, it may be decided that you're very close and should be able to finish soon.

Each assignment equals one letter grade. When you've passed all of the assignments you get an A+. You need to pass one assignment for a D, 2 assignments for a C-, and so on. You must submit 4 assignments so that you don't get an INC. One of the assignments is class participation. You are required to attend all classes, and participate in them (unless a valid excuse is provided) in order to pass that assignment. Therefore, class participation, homework, and attendance is worth an entire letter grade. If you miss more than 2 classes without a valid excuse you lose that letter grade. Completing homework assignments prior to the next class is part of the class participation grade and failing to do so is equivalent to missing a class. Transparent random cold calling will occur in class. This goes toward the class participation mark and you need to demonstrate you’ve done the necessary reading for the class.

Assignments:

The assignment topics are listed below. More details will be given later. All assignments must be completed prior to April 8. No new assignments are accepted after April 8. If you submit an assignment on April 8, and it is deemed complete but not a pass then you have until April 12 to achieve a passing grade on it (which typically means you'll get 1-2 more tries at it). This is running into exam time so schedule your time accordingly. You should expect grade turnaround of approximately 2-4 days up until March. As of March you will not get feedback on an initial assignment submission in less than 4 days (resubmissions faster). Don’t expect to wait until the end to submit your assignments and expect them to be marked immediately. You will be one of a long line of procrastinators.
Assignment #
1. binomial distributions
2. the t-test
3. randomization and bootstrap tests
4. What does an ANOVA mean?
5. analyze some data with ANOVA
6. analyze and visualize some data with multiple regression
7. analyze some data of various types
8. Writing up those analyses from assignments 5, 6, and 7 into APA formatted results sections.
9. Retrieve two journal articles and write reports on their results sections. This is the one written assignment that can be done out of order and submitted at any time. Although, you likely won't be able to do it correctly until at least assignment 3 is done.
10. Class participation (which requires attendance).

Make sure that you do not work together on graded assignments after Assignment 4. Assignments 5 and up need to be done individually. Feel free to work in groups up until Assignment 4 but your assignment must be your own and it must contain a list of the people you worked with (and any outside tutors used for help).

See the Dalhousie Academic Calendar on University regulations regarding cheating and plagiarism. I am obligated to report any instances of academic integrity violations without discussing them with the students involved.

Course Policies

I have no problem with R study groups and helping each other learn R per se. Feel free to ask about R itself in the course discussion forums on blackboard. That's quite different from actually doing the assignments together. Also, I don't mind at all if you work on homework together. Many of your initial questions are answered in "IntroToR" or just loosely on the internet. For example, "how to generate a sequence of numbers in R" comes up with good answers on the internet with an obvious search term. (and you might want to try searching with rseek.org).  

Feel free to email the TAs or I questions and we'll answer as we can. Note that obtaining help from your instructor or TAs will involve demonstrating what you've done to try to help yourself first. Vague or unsupported statements like, "I’ve tried everything", are not sufficient.

You may be called into your instructor’s office, or that of a TA, for a verbal examination relating to your assignment. If you cannot defend the assignment you submitted then you didn’t write it and a submission
will be made to an academic integrity officer. Make certain that you know what every line of what you submit does and why it’s there.

**Course Content**

This is a rough outline of the topics on a week by week basis. They are actually more interconnected than what is portrayed here and many topics, such as interpretation, are really discussed the entire term.

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<thead>
<tr>
<th>week</th>
<th>topic</th>
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<tbody>
<tr>
<td>1</td>
<td>introduction and randomness</td>
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<td>2</td>
<td>simulating data and why we would want to do that</td>
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<td>3</td>
<td>how to read in simple data files in R and starting summarization - non-parametrics, bootstrapping and permutations tests</td>
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<td>4</td>
<td>basic inferences and confidence intervals</td>
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<td>5</td>
<td>t-test and one way ANOVA</td>
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<td>6</td>
<td>regression</td>
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<td>7</td>
<td>correlation, partial and part (semi-partial)</td>
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<td>8</td>
<td>multiple regression</td>
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<td>9</td>
<td>multiple regression</td>
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<td>10</td>
<td>categorical responses</td>
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<td>11</td>
<td>ordinal responses</td>
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<td>12</td>
<td>interpretation</td>
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<td>13</td>
<td>presentation</td>
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ACCOMMODATION POLICY FOR STUDENTS

Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic protected under Canadian Human Rights legislation. The full text of Dalhousie’s Student Accommodation Policy can be accessed here: http://www.dal.ca/dept/university_secretariat/policies/academic/student-accommodation-policy-wef-sep--1--2014.html

Students who require accommodation for classroom participation or the writing of tests and exams should make their request to the Advising and Access Services Centre (AASC) prior to or at the outset of the regular academic year. More information and the Request for Accommodation form are available at www.dal.ca/access.

ACADEMIC INTEGRITY

Academic integrity, with its embodied values, is seen as a foundation of Dalhousie University. It is the responsibility of all students to be familiar with behaviours and practices associated with academic integrity. Instructors are required to forward any suspected cases of plagiarism or other forms of academic cheating to the Academic Integrity Officer for their Faculty.

The Academic Integrity website (http://academicintegrity.dal.ca) provides students and faculty with information on plagiarism and other forms of academic dishonesty, and has resources to help students succeed honestly. The full text of Dalhousie’s Policy on Intellectual Honesty and Faculty Discipline Procedures is available here: http://www.dal.ca/dept/university_secretariat/academic-integrity/academic-policies.html

STUDENT CODE OF CONDUCT

Dalhousie University has a student code of conduct, and it is expected that students will adhere to the code during their participation in lectures and other activities associated with this course. In general:

“The University treats students as adults free to organize their own personal lives, behaviour and associations subject only to the law, and to University regulations that are necessary to protect

• the integrity and proper functioning of the academic and non-academic programs and activities of the University or its faculties, schools or departments;
• the peaceful and safe enjoyment of University facilities by other members of the University and the public;
• the freedom of members of the University to participate reasonably in the programs of the University and in activities on the University’s premises;
• the property of the University or its members.”

The full text of the code can be found here: http://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html
SERVICES AVAILABLE TO STUDENTS

The following campus services are available to help students develop skills in library research, scientific writing, and effective study habits. The services are available to all Dalhousie students and, unless noted otherwise, are free.

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<th>Service</th>
<th>Support Provided</th>
<th>Location</th>
<th>Contact</th>
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<tr>
<td><strong>General Academic Advising</strong></td>
<td>Help with</td>
<td>Killam Library</td>
<td>In person: Killam Library Rm G28&lt;br&gt;By appointment:&lt;br&gt;- e-mail: <a href="mailto:advising@dal.ca">advising@dal.ca</a>&lt;br&gt;- Phone: (902) 494-3077&lt;br&gt;- Book online through MyDal</td>
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<td>- understanding degree requirements and academic regulations</td>
<td>Ground floor Rm G28</td>
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<td></td>
<td>- choosing your major</td>
<td>Bissett Centre for Academic Success</td>
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<td>- achieving your educational or career goals</td>
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<td>- dealing with academic or other difficulties</td>
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<td><strong>Dalhousie Libraries</strong></td>
<td>Help to find books and articles for assignments</td>
<td>Killam Library</td>
<td>In person: Service Point (Ground floor)&lt;br&gt;By appointment:&lt;br&gt; Identify your subject librarian (URL below) and contact by email or phone to arrange a time: <a href="http://dal.beta.libguides.com/sb.php?subject_id=34328">http://dal.beta.libguides.com/sb.php?subject_id=34328</a></td>
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<td>Help with citing sources in the text of your paper and preparation of bibliography</td>
<td>Ground floor Librarian offices</td>
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<td><strong>Studying for Success (SFS)</strong></td>
<td>Help to develop essential study skills through small group workshops or one-on-one coaching sessions</td>
<td>Killam Library 3rd floor Coordinator Rm 3104 Study Coaches Rm 3103</td>
<td>To make an appointment:&lt;br&gt;- Visit main office (Killam Library main floor, Rm G28)&lt;br&gt;- Call (902) 494-3077&lt;br&gt;- email Coordinator at: <a href="mailto:sfs@dal.ca">sfs@dal.ca</a> or&lt;br&gt;- Simply drop in to see us during posted office hours&lt;br&gt;All information can be found on our website: <a href="http://www.dal.ca/sfs">www.dal.ca/sfs</a></td>
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<td>Match to a tutor for help in course-specific content (for a reasonable fee)</td>
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<td><strong>Writing Centre</strong></td>
<td>Meet with coach/tutor to discuss writing assignments (e.g., lab report, research paper, thesis, poster)</td>
<td>Killam Library Ground floor Learning Commons &amp; Rm G25</td>
<td>To make an appointment:&lt;br&gt;- Visit the Centre (Rm G25) and book an appointment&lt;br&gt;- Call (902) 494-1963&lt;br&gt;- email <a href="mailto:writingcentre@dal.ca">writingcentre@dal.ca</a>&lt;br&gt;- Book online through MyDal&lt;br&gt;We are open six days a week &lt;br&gt;See our website: writingcentre.dal.ca</td>
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