PSYC 417A – Applied regression analysis
Syllabus
2021-2022 Winter term II

Instructor: Jason Rights
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Office hours: Tuesdays 4:00pm – 5:00pm PST, or by appointment
Zoom link for office hours and all synchronous sessions:
https://ubc.zoom.us/j/62003299100?pwd=dVdNbmVVSmQ1RUNLQmhFenkrN0ZXdz09
     Meeting ID: 620 0329 9100
     Passcode: 587488

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https://us04web.zoom.us/j/8703709396?pwd=SDdCRXh0UG9rNjBhVHpKYnc1SWpkZz09
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     Passcode: 571149

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https://ubc.zoom.us/j/69009201331?pwd=NjB3MFA5eHoveVIrUTJyN1BwYXMyUT09
     Meeting ID: 690 0920 1331
     Passcode: 501720

Course Goals:

There are three primary goals of this course. The first goal is to provide students with sound foundational knowledge in the theory and concepts of linear regression analysis. The second goal is to develop an ability to properly apply regression methods to empirical data, including making informed decisions about analytic strategies and understanding how to report results. The third goal is to be able to critically evaluate the use of linear regression methods in research literature and the news. This course requires the successful completion of PSYC 218.

Lectures:

The first four weeks of this course will be entirely online (per UBC's guidelines). These first four weeks will include synchronous Zoom lectures on **Mondays, Wednesdays, and Fridays from 1:00-2:00pm PST**. These lectures will be recorded and posted on Canvas afterwards. I will, however, allow for questions/discussion prior to starting the recording, and at the end of the

lecture, I will turn off the recording and wait around for a little while if anyone has additional questions. Attendance is encouraged, but is not mandatory, and students will not be penalized for missing any lecture. The Zoom link is listed above under the instructor information.

After the first two weeks (barring any changes made by UBC), the class will look like this:

- On **Mondays and Wednesdays from 1:00pm-2:00pm**, we will have an in-person class in PCN 1003. The lecture portion of the class will be recorded and posted on Canvas afterwards (I will allow time for unrecorded discussion, if desired). Attendance is completely optional, and you do not need to provide any explanation for not showing up.

- On **Fridays from 1:00pm-2:00pm**, we will have a synchronous Zoom lecture, which will be recorded and posted on Canvas afterwards. Attendance is, again, optional.

Course website:

All course materials will be posted on the course Canvas website. I will post course notes in PDF format before every synchronous lecture, and will post notes along with accompanying videos for asynchronous lectures. Periodically, I will also post homework assignments and readings.

Text and Readings:

There is no required textbook for this course, and all of the graded assignments will only cover material that is explicitly included in the lectures. However, in case you would prefer to additionally consult a textbook as the course progresses, I will recommend chapters from the following introductory textbook:

- Supplemental textbook (not required): Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences.* (3rd edition). Hillsdale, NJ: Erlbaum.

Additionally, several readings will be provided on Canvas. These will include newspaper articles and scientific journal articles that use the methods we cover.

Detail on course content:

The content of the work you will do in this class is a mix of data analysis and conceptual interpretation of methods and results. Both topics are equally important; when going through the motions of the calculations it is essential to understand why you are doing them and what the results mean. Conversely, understanding why you are doing a procedure is of limited utility without understanding computationally how it works.

- In early lectures we will focus on simple calculations of statistics and interpretation of those results. We will use software sparingly. In later lectures, as we increase the number of variables in our analyses, hand calculations become impractical and we will employ statistical software to a greater extent.

- For exams, the objective will be to assess your understanding in a manner that does not require overly lengthy time allocation per question. Homeworks can involve more lengthy calculations than the exams. The exams may involve interpretation, together with limited calculations and short answer or fill-in-the-blank formats. Furthermore, homeworks can require running statistical software for certain questions; the exams will not require running software, but may require interpreting analysis output from software.

Grades:

Course grades will be based on the following components:

- Homeworks:
  - There will be 5 homework assignments.
  - The lowest homework grade will be dropped.
  - The remaining 4 homeworks will be worth 11.25% each (total of 45%)
  - Advice: don't leave the homework assignments to the last minute! It is best to start early so you can have time to get help if needed.

- Exams:
  - There will be two midterm exams worth 15% each (total of 30%), and one final exam worth 25%.
  - The midterm exams will occur on days corresponding to the scheduled class days (i.e., either Monday, Wednesday, or Friday). These will be online, and will be available on Canvas for 24 hours, and you will have 1 hour to complete them once you begin.
  - The date for the final exam will be set by UBC.

Grading scale:

A+	90-100	C+	64-67
A	85-89	C	60-63
A-	80-84	C-	55-59
B+	76-79	D	50-54
B	72-75	F	0-49
B-	68-71		

Statistical software:

R is the statistical application used for this course. R is freely available online and can be downloaded at https://www.r-project.org/. Though not required, it is also recommended to download Rstudio, a nice, user-friendly environment for R. Rstudio can be downloaded at https://rstudio.com/products/rstudio/download/.

No prior knowledge of R or Rstudio will be assumed. I will provide code that can be easily replicated or modified for the purposes of the class.

Late policy:

15% of the homework grade will be deducted for each day late. Note again that the lowest homework grade will be dropped.

If you are unable to take an exam on the scheduled dates, or are unable to complete an assignment, please let me know in advance, or at least as soon as possible. I ask that you do not send me your medical/personal documentation. Accommodations will be made on a case-by-case basis (for UBC's Academic Concession policy, see http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,329,0,0). Depending on a student's specific situation, either a make-up exam/assignment will be scheduled or the course grade will be reweighted to other assignments.

If you have an ongoing health problem that would prevent you from completing multiple exams and assignments, or if you are unable to take the final exam, then you should contact your faculty's advising office to apply for an academic concession.

Academic Misconduct:

The University of British Columbia has a very precise definition of which behaviors count as academic misconduct. You are strongly encouraged to read and make sure you understand this policy. If you have any questions, please ask. You can find the UBC policy on Academic Misconduct here: www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,959

Schedule: <u>*Note*</u>*: This schedule is subject to change. If we do not finish a set of lecture material in a given week, we will continue them in the next week.*

If any changes are made to HW due dates or exam dates, <u>they will only be pushed back</u> (rather than coming earlier), and I will try to give plenty of notice.

Week	Lecture topics (relevant supplemental textbook section in parentheses)
1/10 – 1/14	Orientation; Review of the Pearson correlation (Ch. 1; 2.1-2.2); Factors affecting the size of correlations (Ch. 2.3; 2.10)
1/17 – 1/21	Simple Linear Regression (SLR) (Ch. 2.4-2.7); Inferences for SLR (Ch. 2.8)
1/24 – 1/28	Multiple Linear Regression (MLR) with 2 IVs (Ch. 3.1-3.2) 　　**HW1 due 1/28**
1/31 – 2/4	MLR with *k* IVs, cont. (Ch. 3.5)
2/7 – 2/11	Power analysis for MLR (Ch. 3.7); 　　**Mid-term 1 2/11 → will cover up to lecture 8**
2/14 – 2/18	Hierarchical regression (Ch. 5.3) 　　**HW2 due 2/18**
2/21 – 2/25	*Spring Break*
2/28 – 3/4	Interactions in MLR (Ch. 7.1-7.4); 　　**HW3 due 3/4**
3/7 – 3/11	Assumptions in MLR: Definitions and testing (Ch. 4.1-4.5)
3/14 – 3/18	Categorical IVs: Dummy coding (Ch. 8.1-8.2); Categorical IVs: Effect coding (Ch. 8.3); 　　**HW4 due 3/18**
3/21 – 3/25	Nonlinear regression (Ch. 6.1-6.2); 　　**Mid-term 2 3/25**
3/28 – 4/1	Logistic regression (Ch. 13.2);
4/4 – 4/8	Multivariate models, mediation; 　　**HW5 due 4/6**