PSYC*6940, Course Outline: Winter 2017

General Information

Course Title: Discrete-variable Research Design and Statistics

Course Description:
This course is an in-depth examination of statistical approaches used in psychology, with an emphasis on experimental research designs with discrete independent variables (e.g., t-test, ANOVA, general linear model), and how these approaches address ongoing statistical challenges faced by psychological researchers, such as replication and generalizability.

Credit Weight: 0.50

Academic Department (or campus): Psychology

Semester Offering: W17

Class Schedule and Location:
Lecture: Fridays, 2:30-5:20pm in CRSC 101
Office Hours: Tuesdays and Wednesdays, 2-3pm in 4018 MacKinnon Extension

Instructor Information

Instructor Name: Naseem Al-Aidroos
Instructor Email: naseem@uoguelph.ca
Office location and office hours: Tuesdays and Wednesdays, 2-3pm in 4018 MacKinnon Extension

GTA Information

GTA Name: N/A
GTA Email: N/A
GTA office location and office hours: N/A

Course Content

Specific Learning Outcomes:

Students will be able to, within the context of psychological research:

1. Understand and describe the statistical concepts behind the general linear model, in particular as applied to *t*-tests, ANOVAs, and the Pearson correlation coefficient.

2. Understand and describe the strengths and weaknesses of null-hypothesis testing (NHST).
3. Apply knowledge from (2) to judge when NHST approaches are appropriate.
4. Choose modern solutions that can overcome the limitations of NHST for a given statistical context, such as confidence intervals, registered replications, meta-analyses, and resampling.
5. Understand and describe the differences between NHST and Bayesian statistical approaches; in particular the types of conclusions each approach affords.
6. Write a results section reporting both NHST and Bayesian analyses of psychological data using proper APA format.
7. Create effective visual depictions of data analyses
8. Select and learn new statistical software as needed

Lecture Content: Topics may change

DATE	**TOPIC**
Jan 13	Overview, and software basics
Jan 20	Review of *t*-test, ANOVA, and Pearson correlation coefficient
Jan 27	GLM 1: Building and assessing models
Feb 3	GLM 2: Contrasts
Feb 10	GLM 3: Significance (central limit theorem, sampling distributions, SE)
Feb 17	The New Statistics—Why: NHST, *p*-values, replication
Feb 24	**Winter Break. No Class**
Mar 3	The New Statistics—How: Registered replications, CIs, meta-analysis
Mar 10	Bayesian Approaches: Intro
Mar 17	Bayesian Approaches: Advanced
Mar 24	Resampling/bootstrapping
Mar 31	Creating statistical graphs
Apr 7	Additional software packages

Course Assignments and Tests:

Assignment or Test	**Due Date**	**Contribution to Final Mark (%)**	**Learning Outcomes Assessed**
Assign. 1	Feb 3	20%	1,7,8
Assign. 2	Mar 10	20%	2-4
Assign. 3	Mar 24	20%	5-8
Participation	Apr 7	20%	1-8
Take home exam	Apr 7	20%	1-7

Additional Notes (if required):
Lectures will both introduce new material (i.e., not covered by the assigned readings) and provide opportunities to apply statistical techniques to example problems. Accordingly, attendance and participation are particularly important for this course. The participation component of the final grade is based on the percentage of attended lectures. One class can be missed without penalty; this policy is designed to facilitate attending academic conferences.

Course Resources

Recommended Texts:

Vik, P. (2013). *Regression, ANOVA, and the General Linear Model: A Statistics Primer*. SAGE Publications.

Lee, M. D., & Wagenmakers, E. J. (2014). *Bayesian cognitive modeling: A practical course*. Cambridge University Press.

Other Resources:

Cumming, G. (2013). The new statistics why and how. *Psychological Science*, 0956797613504966.

Gallistel, C. R. (2015). Bayes for beginners: Probability and likelihood. *Observer*, *28*(7); Bayes for beginners 2: The prior. *Observer*, *28*(8); Bayes for beginners 3: The prior in probabilistic inference. *Observer*, *28*(9).

Open Science Collaboration. (2015). Estimating the reproducibility of psychological science. Science, 349(6251), aac4716.

Rougier, N. P., Droettboom, M., & Bourne, P. E. (2014). Ten simple rules for better figures.

Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological Science*, 0956797611417632.

Course Policies

Grading Policies

No late submissions. Late submissions will not be accepted for any course components. Any assignments or exams not submitted by the assigned due date will receive a grade of 0%, unless appropriate documentation is provided within one week to the instructor as evidence of illness or compassionate circumstances.

Course Policy on Group Work:

Assignments must be completed on an individual basis. Collaborations among students for the purposes of writing assignments are prohibited. Any student(s) suspected of unauthorized collaboration will be reported to the Dean's Office for an academic misconduct investigation (see Policy on Cheating & Academic Misconduct below). Note: It is permissible to talk with fellow students to facilitate understanding the material needed to complete an assignment; however, you must write the assignment independently.

Course Policy regarding use of electronic devices and recording of lectures:

Electronic recording of classes is expressly forbidden without consent of the instructor. When recordings are permitted they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

University Policies

Academic Consideration

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, id#, and e-mail contact. See the academic calendar for information on regulations and procedures for Grounds for Academic Consideration

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community, faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring.

University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is detailed in the Graduate Calendar:

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS) as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: Student Accessibility Services Website

Course Evaluation Information

Please refer to the Course and Instructor Evaluation Website

Drop date

The last date to drop one-semester courses, without academic penalty, is March 10, 2017. For regulations and procedures for Dropping Courses, see the Academic Calendar:
Current Graduate Calendar