

Psychological and Quantitative Foundations (PSQF) 6242 Spring 2021: Selected Applications of Statistics

Instructor: Professor Lesa Hoffman (*she, her, hers*)
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Zoom Access: <https://uiowa.zoom.us/my/lesahoffmaniowa>
Meeting ID: 504 435 6512; Mobile Access: +13126266799,,5044356512#

Course Time: Tuesdays and Thursdays 12:30–1:45 PM at zoom link

Zoom-Only Office Hours: Tuesdays and Thursdays 3:15–4:45 PM as a group or by appointment

Schedule of Topics and Events:

This course will meet synchronously on zoom. The planned schedule of topics and events given here may need to be adjusted throughout the course. The online syllabus at the web address below will always have the most current schedule and due dates: <http://www.lesahoffman.com/PSQF6242/index.html>

Course Objectives, Pre-Requisites, and Materials:

This course will illustrate the uses of univariate statistics, bivariate measures of association, and general linear models (i.e., regression, analysis of variance, analysis of covariance) for univariate outcomes. The course is organized to take participants through the steps in a statistical analysis: describing the variables of interest and their zero-order associations; creating predictor variables and building models to evaluate their unique effects; and interpreting and presenting empirical findings. Participants should be comfortable with basic research concepts prior to enrolling. Auditors and visitors are always welcome to attend class.

Class time will be devoted primarily to lectures, examples, and spontaneous review, the materials for which will be available for download at the course website. Attendance via zoom is encouraged but not required; I intend to make video recordings of each class available online, and supplemental videos for specific topics (e.g., software demos) may be posted as well. Readings have been suggested for each topic and may be updated later. There will be no required sessions held outside the regular class time noted above (i.e., no additional midterm or final exam sessions). However, because the course will have an applied focus requiring the use of statistical software, participants are encouraged to attend group-based office hours, in which multiple participants can receive immediate assistance on homework assignments simultaneously.

Course Requirements:

Participants will have the opportunity to earn **up to 100 total points** in this course. Up to **88 points** can be earned from **homework assignments** (approximately 6 in total)—these will be graded for accuracy. Up to **12 points** may be earned from submitting **outside-of-class formative assessments** (approximately 6 in total); these will be graded on effort only—incorrect answers will not be penalized. Please note there will also be an opportunity to earn up to **3 points of extra credit** (labeled as homework 0; see the online syllabus for more information). There may be other opportunities to earn extra credit at the instructor's discretion.

Policy on Late Assignments, Formative Assessments, and Grades of Incomplete:

In order to provide participants with prompt feedback, **homework assignments submitted any time after the deadline will incur a 1-point penalty**. However, extensions will be granted as needed for extenuating circumstances (e.g., conferences, comprehensive exams, family obligations) if requested **at least two weeks**

in advance of the due date. Late or incomplete outside-of-class formative assessments will incur a 0.5-point penalty. A final grade of “incomplete” will only be given in dire circumstances and entirely at the instructor’s discretion. **All work must be submitted by Friday, May 14, 2020 at 5:00 PM.**

Final grades will be determined by the *proportion* earned out of the total possible points:

>96 = A+, 93–96 = A, 90–92 = A–, 87–89 = B+, 83–86 = B, 80–82 = B–,
77–79 = C+, 73–76 = C, 70–72 = C– (**PASS**), 67–69 = D+, 63–66 = D, 60–62 = D–, <60 = F

Course Software:

Participants will need to have access to statistical software that can estimate the models presented. Although the course will feature SAS and STATA primarily, other software programs (e.g., SPSS, R) could also be used to complete homework assignments. All of these are freely available to University of Iowa members through the UIowa Virtual Desktop: <https://virtualdesktop.uiowa.edu/Citrix/VirtualDesktopWeb/>; A second free option for software off-campus is the Research Remote Desktop here: <https://its.uiowa.edu/rrds>, although this option is not meant for course work. As a third option, SAS university edition is available for free here: https://www.sas.com/en_us/software/university-edition.html Finally, as a fourth option, 6-month student licenses for STATA are \$48 here: <https://www.stata.com/order/new/edu/gradplans/student-pricing/>

Course Readings (all available via "Files" in ICON):

Cohen, J. (1994). The earth is round ($p < .05$). *American Psychologist*, 49(12), 997–1003.

Hoffman, L. (2015). *Longitudinal analysis: Modeling within-person fluctuation and change*. New York, NY: Routledge Academic.

Howell, D. C. (2010). *Statistical methods for psychology* (7th ed). Belmont, CA: Cengage Wadsworth.

Rodgers, J. L. (2019). Degrees of freedom at the start of the second 100 years: A pedagogical treatise. *Advances in Methods and Practices in Psychological Science* 2(4), 396–405.

Williams, M. N., Grajales, C. A. G., & Kurkiewicz, D. (2013). Assumptions of multiple regression: Correcting two misconceptions. *Practical Assessment, Research, and Evaluation*, 18, Article 11.

Optional Course Textbook (recommended for future Stata reference, optional purchase):

Mitchell, M. N. (2015). *Stata for the behavioral sciences*. College Station, TX: Stata Press.

Academic Misconduct:

As a reminder, the University of Iowa College of Education has a formal policy on academic misconduct, which all students in this course are expected to follow. Please consult the instructor if you have questions.

Accommodating Students with Disabilities:

Students with disabilities or who have other special needs are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation.

Respect for Diversity:

It is the instructor’s intent that students from ALL backgrounds and perspectives feel welcome and encouraged to participate in this course. There is no such thing as a “stupid” question (or answer). All course participants—enrolled students and auditing visitors—should always feel welcome to ask whatever questions will be helpful in helping them understand and follow the course content. You may do so during class, in office hours, over email, or in individual appointments with the instructor (available by request).

With respect to zoom class sessions, please provide the name you wish for us to call you inside your zoom account (i.e., so that it appears on your window while in use) along with a picture—it can be a real picture, an avatar, or a cartoon—just something by which we can differentiate you. Student use of cameras and microphones during class is also encouraged but not required (out of respect for your privacy and/or limited bandwidth). Please note that class video recordings streamed to YouTube will NOT include any video from course participants (only the zoom audio and screen share from the instructor will be captured).

The University of Iowa is committed to making the classroom a respectful and inclusive space for people of all gender, sexual, racial, religious, and other identities. Toward this goal, students are invited in MyUI to optionally share the names and pronouns they would like their instructors and advisors to use to address them. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University's Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity (<https://diversity.uiowa.edu/eod>; 335-0705 or diversity.uiowa.edu).

Respect for The Rest of Your World:

The instructor realizes that this course is not your only obligation in your work or your life. If work or life events (expected or unexpected) may compromise your ability to succeed in this course, PLEASE contact the instructor for a confidential discussion so that we can work together to make a plan for your success. Please do not wait to do so until you are too far behind to catch up!

Schedule of Events for Weeks 1–5:

Week	Date	Topics	Suggested Readings for Each Topic
	1/25	NO HOMEWORK (HW) OR FORMATIVE ASSESSMENT (FA) DUE	
1	1/26	Lecture 0: Introduction to this Course and to Quantitative Methods	Howell ch. 1 Mitchell ch. 1
	1/28	Lecture 0, continued Lecture 1 and Example 1: Univariate Data Description and Inference	Howell ch. 2-3, 4-5
	2/1	NO HW OR FA DUE	
2	2/2	Watch video on your own: Introduction to the Online Homework System Lecture 1 and Example 1, continued	
	2/4	Lecture 1 and Example 1, continued	
	2/8	HW0 (for 3 points extra credit) DUE ONLINE BY 11:59 PM	
3	2/9	Watch videos on your own: Using SAS or STATA on the Ulowa Virtual Desktop Lecture 1 and Example 1, continued	
	2/11	Lecture 2 and Example 2: Bivariate Association and Significance Testing	Howell ch. 6 Mitchell ch. 2-3
	2/15	FA1 DUE VIA ICON BY 11:59 PM	
4	2/16	Lecture 2 and Example 2, continued	Cohen (1994)
	2/18	Lecture 2 and Example 2, continued	
	2/22	NO HW OR FA DUE	
5	2/23	Lecture 2 and Example 2, continued	
	2/25	Review and discussion using: This Article, These Effect Size Conversion, and These Power Table	

Schedule of Events for Weeks 6–16:

Week	Date	Topics	Suggested Readings for Each Topic
6	3/1	HW1 (based on Example 1) DUE ONLINE BY 11:59 PM	
	3/2	NO CLASS OR OFFICE HOURS	
	3/4	Lecture 3 and Example 3: General Linear Models (GLMs) with a Single Fixed Effect for Each Predictor	Howell ch. 7-9, 11-12 Mitchell ch. 4-5 Williams et al. (2013)
7	3/8	FA2 DUE VIA ICON BY 11:59 PM	
	3/9	Lecture 3 and Example 3, continued	
	3/11	Lecture 3 and Example 3, continued	
8	3/15	HW2 (based on Example 2) DUE ONLINE BY 11:59 PM	
	3/16	Lecture 3 and Example 3, continued	
	3/18	Lecture 3, continued Lecture 4 and Example 4: GLMs with Multiple Fixed Effects for Each Predictor	Howell ch. 15 Mitchell ch. 6-11 Rodgers (2019)
9	3/22	FA3 DUE VIA ICON BY 11:59 PM	
	3/23	Lecture 4 and Example 4, continued	
	3/25	Lecture 4 and Example 4, continued	
10	3/29	HW3 (based on Example 3) DUE ONLINE BY 11:59 PM	
	3/30	Lecture 4 and Example 4, continued	
	4/1	Lecture 4 and Example 4, continued	
11	4/5	FA4 DUE VIA ICON BY 11:59 PM	
	4/6	Lecture 4 and Example 4, continued	
	4/8	Lecture 5 and Example 5: GLMs with Multiple Predictors	Mitchell ch. 14-19 Hoffman ch. 2 sect. 1
12	4/12	HW4 (based on Example 4) DUE ONLINE BY 11:59 PM	
	4/13	Lecture 5 and Example 5, continued	
	4/15	Lecture 5 and Example 5, continued	
13	4/19	FA5 DUE VIA ICON BY 11:59 PM	
	4/20	Lecture 6 and Example 6: GLMs with Single-Slope Interaction Effects	Hoffman ch. 2 sect. 2
	4/22	Lecture 6 and Example 6, continued	
14	4/26	HW5 (based on Example 5a/5b) DUE ONLINE BY 11:59 PM	
	4/27	Lecture 6 and Example 6, continued	
	4/29	Lecture 6 and Example 6, continued	
15	5/3	FA6 DUE VIA ICON BY 11:59 PM	
	5/4	Lecture 6 and Example 6, continued	
	5/6	Lecture 7 and Example 7: GLMs with Multiple-Slope Interaction Effects	Hoffman ch. 2 sect. 3+
16	5/11	NO CLASS, but office hours from 12:30-4:45	
	5/13	NO CLASS, but office hours from 12:30-4:45	
	5/14	HW6 (based on Example 6) DUE ONLINE BY 5:00 PM ALL OUTSTANDING WORK MUST BE COMPLETED BY 5:00 PM	