Research Design
PSYC 504
Course Syllabus
Spring 2020

Section 52530D

Updated: 11 December 2019

Lecture Meeting Time:	W & F 10:00 - 12:00
Room:	Von KleinSmid Center (VKC), Room 208
Instructor:	Christopher R. Beam, Ph.D.
Office:	Seeley G. Mudd (SGM), Room 934
Office Hours:	Wed & Fri 12:00 - 1:00 (or by appointment)
Email:	beamc@usc.edu

1 Course Description & Overview

Coursework focuses on methodologies commonly (and not so commonly) used in psychological research. Topics include general and generalized linear models, reliability, validity, generalizbility, latent variable modeling (SEM), path analysis, moderation, mediation, item response theory, null hypothesis significance testing and alternatives (e.g., Bayesian modeling), sampling bias, missing data analysis, and power. The purpose of this course is for graduate students to broaden and deepen their ability to design and carry-out independent research, as well as to critically evaluate research findings in their respective areas of study.

Course material will consist of lectures, demonstrations of statistical analyses, assignments, and exams. Demonstrations, assignments, and exams will take place in R.

The textbook for this course is Raykov & Marcoulides' *Introduction to Psychometric Theory*. Use will also be made of handouts and other readings posted on Blackboard. Students are strongly encouraged to apply the approaches and methods under discussion to their own data and to bring results to any class for discussion and critique.

1.1 Prerequisites

Familiarity with basic statistical methods, data analytic procedures(e.g., exploratory data analysis, multiple linear regression, and logistic regression), and R is presumed.

1.2 Attendance

Students are expected to attend every lecture. Students who miss a lecture should notify Christopher Beam in advance with the exception of emergencies.

1.3 Blackboard

Blackboard will be used to convey the syllabus, readings, and assignments as well as to collect assignments. Grades will not be recorded on Blackboard.

2 Student Evaluation

Assignments and Examinations
Weekly assignments typically will cover material covered the week they are assigned. Some assignments (e.g., path analysis, mediation) will build on previously presented material (e.g., lavaan). This means that it is important to stay abreast of assignments. Students will be given one week to work on assignments. Working in groups is encouraged. Weekly assignments should be submitted by their due date via Blackboard. Examinations, on which students will be given a week to work, will involve both abstract and computational elements. Students are expected to work on exams independently of another under the honor system. The final grade will be based 30% on assignments, 35% on the midterm examination, and 35% on the final examination. Letter grades will be assigned based on the percentage of points earned (traditional rounding rules to 2 decimal places apply):

A: $\geq 93\%$ A-: 90-92.99
B+: 87-89.99   B: 83-86.99   B-: 80-82.99
C+: 77-79.99   C: 73-76.99   C-: 70-72.99
D+: 67-69.99   D: 63-66.99   D-: 60-62.99
F: $\leq 59.99\%$

Late assignments generally are not accepted. Students who are ill, have an emergency, or will be away for a conference or other academic reason should consult with Beam in advance.

3 Academic Accommodations

Any student requesting academic accommodations based on a disability is required to register with Disability Services Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in GFS 120 and is open 8:30am-5:00pm, Monday through Friday. The phone number for DSP is (213) 740-0776.

4 Academic Integrity

All students are expected to complete their own work. Violations of academic integrity (e.g., plagiarism, resource sharing) are serious and not taken lightly. For more information on Academic Integrity consult the Trojan Integrity Guide at http://www.usc.edu/student-affairs/SJACS/forms/tio.pdf. Students caught cheating (regardless of level of involvement) will automatically fail the course and a report will be filed with USC's Office of Student Judicial Affairs and Community Standards.

5 Academic Conduct

Plagiarism - presenting someone else's ideas as your own, either verbatim or recast in your own words - is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

6 Support Systems

Student Health Counseling Services: (213) 740-7711 – 24/7
on call engemannshc.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 - 24/7 on call

suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call

engemannshc.usc.edu/rsvp

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) | Title IX - (213) 740-5086

equity.usc.edu, titleix.usc.edu

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support - (213) 740-2421

studentaffairs.usc.edu/bias-assessment-response-support

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

The Office of Disability Services and Programs - (213) 740-0776

dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710

studentaffairs.usc.edu/ssa

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101 diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321 & HSC: (323) 442-1000
24/7 on call dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 - 24/7 on call dps.usc.edu Non-emergency assistance or information.

7 Course Schedule

A schedule of dates, topics and readings are shown below.

Date	Topic	Reading	Lab Activity
1/15, 1/17	Overview, bias, sampling distributions	Ioannidis (2005)	R review (in class only)
1/22, 1/24	Research Strategies, Statistical Concepts	R&M Ch.2	General linear model
1/29, 1/31	Classical Test Theory, Reliability	R&M Chs.5,6	Estimating reliability
2/5, 2/7	Scale development, Factor Analysis	R&M Chs.3,4,	Introduction to lavaan
2/12, 2/14	Validity	R&M Ch.8,	Estimation and tests of validity
2/19, 2/21	Generalizability	R&M Ch.9	gtheory package
2/26, 2/28	Experimental designs & causality	Loehlin (2003) Chs.1-2	Path analysis in lavaan
3/4, 3/6	Replication "crisis" & open science **Midterm handed out**	Nosek et al. (2015), Gilbert et al. (2016); Open Science Collaboration (2015)	No lab assignment (midterm)
3/11, 3/13	Moderation & Mediation **midterm due**	Fairchild & MacKinnon (2009); MacKinnon, Fairchild, & Fritz (2007); Hayes (2015)	Mediation in lavaan
3/18, 3/20	Spring Break		
3/25, 3/27	NHST, power, & Bayesian modeling	Cohen (1994); Loftus (1996); XXXX	Introduction to OpenBugs software
4/1, 4/3	Missing Data	Baraldi & Enders 2010; Graham (2009)	mice package

4/8, 4/10	Classification	Turkheimer, Ford, & Oltmanns	cluster analysis & multidimensional scaling
4/15, 4/17	Repeated Measures	Hox (2000); McArdle & Bell (2000)	ANOVA & lmer
4/22, 4/24	Model testing & equivalence	Rhemtulla, van Bork, & Borsboom (2019)	Model Fit
4/29, 5/1	Categorical Outcomes	MacCallum et al. (2002)	logistic regression & glmer (in class only)
M (5/04)	**Final Exam Handed out**		
M (5/11)	**Final Exam due**		