

PSYCHOLOGY 202B
Advanced Psychological Statistics II
Spring 2013

INSTRUCTOR:

Sarah Depaoli (sdepaoli@ucmerced.edu)

Office Location: SSM 312A

Office Phone: (209) 349-1198 (although email will result in a faster response)

Office Hours: T: 4:30-7:00 p.m., or by appointment

Course Website: <http://faculty1.ucmerced.edu/sdepaoli>

TEXT:

Recommended (wait for professor's explanation on texts before purchasing):

Fox, J. (2008). *Applied Regression Analysis and Generalized Linear Models*. Los Angeles, CA: Sage.

or

Keith, T. Z. (2006). *Multiple Regression and Beyond*. San Francisco, CA: Pearson.

*Note that there may be additional readings provided by the instructor that you will be responsible for.

COURSE TIME/LOCATION:

TR 3:00 - 4:15 p.m., Room 274, Classroom and Office Building

COURSE DESCRIPTION:

This course is a continuation of Psychology 202a, Advanced Psychological Statistics I. Psychology 202b will largely focus on the underpinnings of multiple regression analysis. More complex models that subsume multiple regression will also be explored. Specifically, we will cover structural equation modeling (coupled with path analysis, exploratory factor analysis, and confirmatory factor analysis) and hierarchical linear modeling. This course will utilize several different statistical programs which include: (1) the R programming environment, (2) *Mplus* student version, and (3) HLM student version.

COURSE GOALS:

In this course, you will:

- Learn basic linear algebra and understand how it relates to regression analysis
- Review simple and multiple linear regression
- Learn how to simulate data to illustrate statistical issues
- Learn about regression diagnostics and data transformations

- Learn how to model and interpret interactions involving both categorical and continuous predictors
- Investigate traditional approaches to sequential regression, including moderation and mediation
- Be introduced to path analysis
- Be introduced to exploratory and confirmatory factor analysis
- Be introduced to structural equation modeling with latent variables
- Be introduced to regression analysis with nested data structures
- Learn basic approaches to analyzing longitudinal data
- Be introduced into alternative estimation approaches, namely the Bayesian estimation framework

PREREQUISITES:

- Graduate status in Psychology or consent of the instructor. The class assumes that students have had prior exposure to statistics equivalent to an undergraduate introductory course and Psychology 202a (Advanced Psychological Statistics I).
- We will largely be using the R programming environment to carry out model estimation in this course. The lecture content and course assignments will focus heavily on this programming language. If you do not have experience with this programming environment, please see the instructor to set up a “catch-up” meeting. (Note also that we will be using the free student versions of *Mplus* and HLM. However, prior knowledge of this software is not required for this course).

COURSE GRADES:

Grading is based on homework assignments (40%), an in-class midterm (30%), and an in-class final (30%).

Grades will be assigned based on a percentage scale. Homework assignments will be graded based on 10 points. The midterm and final will be graded based on 100 points. A weighted linear combination will be taken at the end of the semester to determine the final course grade using the following criteria:

- Incomplete Grade in Course:
 - A grade of “I” (Incomplete) will be assigned only at the discretion of the instructor and only in the event of extraordinary circumstances. A written request must be filed and a written approval granted before the Incomplete may be taken

Percentage	Grade
95-100	A
92-94	A-
89-91	B+
85-88	B
82-84	B-
79-81	C+
...	

ACADEMIC INTEGRITY:

Students should be familiar with University policies on academic honesty. A general code of conduct for the University of California can be found at:
<http://www.ucop.edu/ucophome/coordrev/ucpolicies/aos/uc100.html>.

- Basically, do not cheat or plagiarize. This will earn you a very uncomfortable meeting with the professor of the course and a **ZERO** on the exam/assignment.
- **There is NO exception to this rule!!**
- Students who are caught cheating on an in-class exam will be **immediately** asked to leave the class. The cheating incident will be reported to the Graduate Dean of Students, and a zero will be given for the score of the exam.
- Note that this policy will be upheld equally for people trying to copy work and also for people trying to help others.
- If you have questions about this policy and/or the consequences listed above, please see the professor as soon as possible.
- Students are encouraged to work together on computational aspects of the homework assignments using *R* programming (or akin). However, it is expected that you work independently on hand-calculation, discussion, and interpretation portions of the assignments. The words you submit in your written assignments should be entirely your own.
- You are expected to work independently on exams. However, you will be allowed to use one full sheet of notes (front and back) during exams. This policy exists to avoid the need for tedious memorization, but this should *not* act as a substitution for in-depth understanding of the material.

STUDENTS WITH SPECIAL NEEDS:

UCM provides individuals with disabilities reasonable accommodations to participate in educational programs, activities, and services. Students with disabilities requiring accommodations to participate in class activities or meet course requirements should contact the professor as early as possible, and also contact the UCM Disability Services Center located in Room 107 of the Kolligian Library (209-381-7862) to obtain their assistance and coordination in working with this course.

CLASSROOM CIVILITY:

Each UCM student is encouraged to help create an environment during class that promotes learning, dignity, and mutual respect for everyone. Students who speak at inappropriate times, sleep in class, display inattention, take frequent breaks, interrupt the class by coming to class late, engage in loud or distracting behaviors, use cell phones or other electronic devices in class, use inappropriate language, are verbally abusive, display defiance or disrespect to others, or behave aggressively toward others could be asked to leave the class and be subjected to disciplinary action.

COURSE OUTLINE:

**Note that the schedule of course content and assignment dates are subject to change, but exams will be held on fixed dates.

Week 1 (1/22 & 1/24): *Intro, course website, obtaining R , matrix algebra*

- Reading for the week: CH 1
- Assignments:

Week 2 (1/29 & 1/31): *Simple linear regression, multiple regression in matrix form, properties of least squares, R^2*

- Reading for the week: CH 2
- Assignments: Distribute HW 1 Tues

Week 3 (2/5 & 2/7): *Categorical predictors, interactions, assumptions, outliers*

- Reading for the week: CH 3,4, 6, 7
- Assignments: HW 1 due Tues

Week 4 (2/12 & 2/14): *Influence and collinearity*

- Reading for the week: CH 5
- Assignments: Distribute HW 2 Thurs

Week 5 (2/19 & 2/21): *Condition number, condition index, variance decomposition, model building, nonlinear regression, GLM, categorical outcomes*

- Reading for the week: CH 8,9
- Assignments:

Week 6 (2/26 & 2/28): *The linear probability model, probit and logit regression*

- Reading for the week:
- Assignments: HW 2 due Thurs

Week 7 (3/5 & 3/7): *Probit and logit regression, moderation and mediation*

- Reading for the week:
- Assignments: Distribute HW 3 Tues

Week 8 (3/12 & 3/14): *Moderation and mediation, review*

- Reading for the week:
- Assignments: HW 3 due Tues, IN-CLASS MIDTERM ON THURSDAY!!!

Week 9 (3/19 & 3/21): *Review of midterm, catch-up, path analysis*

- Reading for the week: CH 10, 11
- Assignments:
- Notes: *If the instructor approves, Thursday can be canceled due to SBM conference*

Week 10 (3/26 & 3/28): **SPRING BREAK—No Class**

- Reading for the week:
- Assignments:

Week 11 (4/2 & 4/4): *Path analysis cont., EFA*

- Reading for the week: CH 12, 13
- Assignments: Distribute HW 4 Thurs

Week 12 (4/9 & 4/11): *EFA, CFA*

- Reading for the week: CH 14, 15
- Assignments:

Week 13 (4/16 & 4/18): *CFA cont., SEM*

- Reading for the week: Ch 16, 17
- Assignments: HW 4 due Tues

Week 14 (4/23 & 4/25): *SEM cont., catch up*

- Reading for the week:
- Assignments: Distribute HW 5 Thurs

Week 15 (4/30 & 5/2): *HLM*

- Reading for the week: TBD
- Assignments: HW 5 due Thurs
- *Note that the instructor will be out on Tuesday*

Week 16 (5/7 & 5/9): *HLM cont.*

- Reading for the week: TBD
- Assignments: Distribute HW 6 Tues

FINAL EXAM WEEK:

5/13: HW 6 due by 3:00pm in my box, email, or hand-delivered; Scheduled Final Exam Day 6:30-9:30pm, COB 274

- Bring pencils/pens, class-approved calculator, and note sheet (if desired)
- *Note that you will have 3 hours to complete the cumulative final exam (meaning it covers the entire semester worth of material)*