

PSYCHOLOGY 202A
Advanced Psychological Statistics I
Fall 2011

INSTRUCTOR:

Sarah Depaoli (sdepaoli@ucmerced.edu)

Office Location: SSM 312A

Office Phone: (209) 228-4549 (although email will result in a faster response)

Office Hours: T 2:45-4:15pm, or by appointment

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

TEXT:

Required:

Howell, D. C. (2007). *Statistical methods for psychology* (7th Ed.). Belmont, CA: Thomson Wadsworth.

Recommended:

Braun, W. J., & Murdoch, D. J. (2007). *A first course in statistical programming with R*. United Kingdom: University Press, Cambridge.

Zuur, A. F., Ieno, E. N., & Meesters, E. (2009). *A beginner's guide to R*. New York, NY: Springer.

*Note: please do not purchase the optional texts before the first day of class

COURSE TIME/LOCATION:

TR 1:30 - 2:45 p.m., Room 209, Classroom and Office Building

COURSE DESCRIPTION:

Psychology 202a largely focuses on the general linear model. The course covers descriptive statistics, graphing methods, variability, probability distributions and theory, hypothesis testing, z -tests, t -tests, correlation, regression, and variants of analysis of variance. This course will largely focus on hand-computations in order to strengthen the understanding of the various procedures discussed. However, there is also a strong computational component of this course which relies on the R programming environment.

COURSE GOALS:

- Build a strong foundation of basic statistical concepts
- Grasp the fundamentals of probability theory
- Introduction to the general linear model
- Recognize connections between common models (e.g., t -test, regression, and ANOVA)
- Understand more complex models and the appropriate assumptions linked with those models

- Learn basic programming in R (e.g., plotting, testing assumptions, estimating models)

PREREQUISITES:

- First year graduate status in Psychology or instructor consent.
- Some prior exposure to statistics through an undergraduate introductory course. If you have not had this prior exposure, it is still possible to do well in this course with extra effort in the first few weeks of the semester—please see the instructor if this applies to you.
- Basic mathematical skills: algebra basics (the ideas of equations and manipulation of variables), and geometry (plotting points on a plane, the equation of the line). If you feel ill-prepared in any of those areas, a quick review might be in order.

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:

Percentage	Grade
101+	A+
95-100	A
92-94	A-
89-91	B+
85-88	B
82-84	B-
79-81	C+
75-78	C
72-74	C-
69-71	D+
65-68	D
62-64	D-
0-61	F

If a student is on the cusp between two letter grades, classroom participation will determine whether the student receives the higher or lower letter grade.

ACADEMIC INTEGRITY:

Students should be familiar with University policies on academic honesty.

- Students are encouraged to work together on computational aspects of the homework assignments using *R* programming. 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) as well as your text book 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.

COURSE OUTLINE:

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

Week 1:

8/25: Intro to the course, populations vs samples, research questions, Intro to R

- Reading: None
- Assignments: Download R on your computer at home

Week 2:

8/30: Basics of using R (bring laptops if you like)

- Reading: Chapter 1; Chapter 2 (§1-7)
- Assignments: None

9/1: Types of variables, scales of measurement, graphing techniques

- Reading: Chapter 2 (§8-9)
- Assignments: None

Week 3:

9/6: Central tendency, measures of variability (variance, standard deviation)

- Reading: None
- Assignments: None

9/8: Shape of data (skewness, kurtosis), normality, outliers, transformations

- Reading: Chapter 2 (§11-12)
- Assignments: None

Week 4:

9/13: z-scores, area under the curve

- Reading: Chapter 3 (§1-4)
- Assignments: Pass out HW 1

9/15: Catch-up day

- Reading: None
- Assignments: None

Week 5:

9/20: Intro to probability, random variables, combining probabilities

- Reading: Chapter 5 (§1-6)
- Assignments: HW 1 due

9/22: Statistical independence, conditional probabilities, Bayes' theorem

- Reading: Chapter 5 (§7)
- Assignments: None

Week 6:

9/27: Binomial distribution, sampling distributions, hypothesis testing

- Reading: Chapter 3 (§5-6); Chapter 5 (§8-9)
- Assignments: Pass out HW 2

9/29: Hypothesis testing cont., central limit theorem, z-test

- Reading: Chapter 4 (§1-13), Chapter 7 (§1-2)
- Assignments: None

Week 7:

10/4: One-sample t-test, effect sizes, confidence intervals

- Reading: Chapter 7 (§3, pp 200-201)
- Assignments: HW 2 due

10/6: Two-sample t-tests, repeated measures t-tests

- Reading: Chapter 7 (§5-8)
- Assignments: Pass out HW 3

Week 8:

10/11: Midterm review (come with questions)

- Reading: None
- Assignments: None

10/13: MIDTERM—in class

- Reading: None
- Assignments: HW 3 due

Week 9:

10/18: Review of the midterm, introduction to correlation

- Reading: Chapter 9 (§1-4)

- Assignments: Pass out HW 4

10/20: Covariance and correlation

- Reading: None

- Assignments: None

Week 10:

10/25: Simple linear regression, link to t-test

- Reading: Chapter 9 (§5-10, 13-14)

- Assignments: Pass out HW 5, HW 4 due

10/27: Multiple linear regression

- Reading: Chapter 15 (§1-8)

- Assignments: None

Week 11:

11/1: Analysis of variance

- Reading: Chapter 11 (§1-5)

- Assignments: HW 5 due

11/3: Analysis of variance cont.

- Reading: None

- Assignments: Pass out HW 6

Week 12:

11/8: Contrasts and comparisons

- Reading: Chapter 12 (§1-3, 6-8), Chapter 16 (§1-2)

- Assignments: None

11/10: Power

- Reading: Chapter 8, Chapter 11 (§12)

- Assignments: HW 6 due

Week 13:

11/15: Factorial analysis of variance

- Reading: Chapter 13 (§1-5)

- Assignments: None

11/17: Factorial analysis of variance (crossed versus nested designs)

- Reading: Chapter 13 (§6-10)

- Assignments: Pass out HW 7

Week 14:

11/22: Class canceled (I will be available in my office)

- Reading: None
- Assignments: None

11/24: Class canceled (Thanksgiving)

- Reading: None
- Assignments: None

Week 15:

11/29: Analysis of covariance, random effects vs. fixed effects

- Reading: Chapter 16 (§5-9); Chapter 11 (§10); Chapter 13 (§8,11)
- Assignments: HW 7 due, pass out HW 8

12/1: Computing analyses in different statistical programs (Room TBA)

- Reading: None
- Assignments: None

Week 16:

12/6: Review for final

- Reading: None
- Assignments: HW 8 due

12/8: Review of all homework assignments, question time

- Reading: None
- Assignments: None

Week 17:

12/16: FINAL EXAM: 11:30-2:30pm, Classroom 209