

# PSYC 274 - Statistics I

## Course Syllabus

Updated: April 29, 2016

Section 52452R(Lecture)/52451R(Lab)

Summer 2016

**Lecture Meeting Time:** T & Th 9:30 - 11:50  
**Room:** Seeley G. Mudd (SGM), Room 226

**Lab Meeting Times:** T & Th 12:30 - 2:20  
**Room:** Seeley G. Mudd (SGM), Room 631

**Instructor:** Christopher R. Beam, Ph.D.  
**Office:** Seeley G. Mudd (SGM), Room 523  
**Office Hours:** T & W 2:30 - 3:30 (or by appointment)  
**Email:** beamc@usc.edu

**Text:** Welkowitz, J., Cohen, B.H., & Lea, R.B. (2012). *Introductory statistics for the behavioral sciences (7<sup>th</sup> Edition)*. Hoboken, NJ: John Wiley & Sons, Inc. ISBN: 9780470907764

## 1 Course Description

This course will teach you how to use statistics in the context of research. We will cover the basic concepts of statistics, scales of measurement, describing data (exploratory data analysis), the normal distribution and probability, inferential statistics, the logic of hypothesis testing, including the merits and limitations of classic and more modern approaches, elementary research methods, t-tests, analysis of variance, correlation, simple and multiple regression, effect size, confidence intervals, power and sample size, and nonparametric tests for categorical and ranked data.

Statistics I consists of both a lecture and a laboratory component. The pedagogical goal is to expose you to the use of statistical procedures to answer scientific questions in a systematic and convincing manner. Lecture consists of instruction and practice

problems (individual and in small groups). Lab consists of learning explore and analyze data using R computer software (<https://www.r-project.org/>). Laboratory assignments will be graded and returned by the following laboratory session. The TA will review laboratory assignments from the previous week at the beginning of each session.

## 1.1 Attendance & Participation

### 1.1.1 Lecture

Lecture attendance is not mandatory. You are, however, responsible for knowing the material. Come to class prepared and ready to ask questions and contribute to the discussion. Course content is introduced gradually and builds on previous sessions. The statistical and methodological concepts we will cover are easy to master as long as you attend every lecture and lab session, read the text, and earnestly complete the lab and homework problem sets. Please be on-time - walking in late is disruptive to other students and instructors.

### 1.1.2 Laboratory Sessions

Lab session attendance is **mandatory**. Attendance will be taken each session. Failure to attend will result in 1% lower **final** grade *per missed laboratory session*. Obviously illness or emergencies will be excused with sufficient documentation (e.g., physician's note). Missing lab sessions because of athletic events or other extracurricular activities (e.g., clubs, band, service organizations) will not be excused. Schedule accordingly to make sure you attend each lab session.

## 1.2 Blackboard

All assignments will be posted on Blackboard. Announcements and emails are made via Blackboard in this course. **Routinely check the course site for updates, as you are responsible for keeping track of all updates in this course.** All grades will be posted on Blackboard. Grade discrepancies and corrections need to be made prior to the final exam. No grade changes will be made via Blackboard after the final exam.

## 1.3 Electronic Devices

**Electronic devices of all kinds (other than a graphing and basic scientific calculators) are prohibited in this course. NO EXCEPTIONS.** Calculator apps on smartphones may not be used. Research supports that note-taking by writing, rather than by typing, improves conceptual learning (see article by Mueller & Oppenheimer (2014) on Blackboard).

## 2 Laboratory Sessions

Each session will consist of instruction on how to use R software execute statistical procedures and interpret results. **If you find yourself struggling with the assignments, do not wait until the end of the semester to meet with Dr. Beam for additional help; sooner is better to target problems you are having early on.**

### 2.1 Software

You will learn how to conduct descriptive and inferential statistical analyses using R (<https://www.r-project.org/>). R is a flexible platform for statistical computing that is free. While the initial learning curve for R typically is difficult, the long-term benefits consist of cultivating a more thoughtful approach to your research and statistical analyses. As an additional resource, please visit Professor Revelle's homepage: <http://www.personality-project.org/r/>. Plenty (if not all) R documentation is publicly available on Professor Revelle's website.

## 3 Student Evaluation

Course grades will be assigned based on the following assignments and examinations:

Assignment or Examination	Percentage Contribution
First Midterm Exam	25%
Second Midterm Exam	25%
Final Exam	30%
Laboratory Assignments	10%
Homework Problems	10%
<b>Total Grade Basis</b>	<b>100%</b>

Letter grades will be assigned based on the percentage of points earned (traditional rounding rules apply):

A: $\geq 93\%$	A-: 90-92	
B+: 87-89	B: 83-86	B-: 80-82
C+: 77-79	C: 73-76	C-: 70-72
D+: 67-69	D: 63-66	D-: 60-62
F: $\leq 59\%$		

The course is designed to encourage spaced learning. Two research articles on the benefits of spaced learning are available on Blackboard for further reading.

\*\*\*Address all grade concerns early in the semester rather than later in the semester.\*\*\*

### 3.1 Homework & Lab Assignments

There are 10 homework assignments. Each homework assignment is worth 10 points and due in person at the beginning of the class. Assignments may be hand written or typed.

There are 10 lab assignments. Assignments are graded on a scale from 0-2 (2 = best score). Lab assignments follow a specific format and must be turned in (on Blackboard) as R script. **Lab assignments must be submitted via Blackboard by the end of Monday (11:59p).**

\*\*\*Late assignments will not be accepted apart from illness or emergency (with acceptable documentation). No exceptions.\*\*\*

### 3.2 Exams

Exams include conceptual and calculation problems. A hand calculator that has a memory and can take square roots is needed for classroom examples and exam problems. Scientific calculators are inexpensive and cost around \$10-15. Be sure to bring a calculator to class and the exams. Calculators may not be shared during exams. Graphing calculators are prohibited from use during exams.

You may bring a "formula reminder sheet" to exams. **This sheet is limited to 1 side of an 8.5in. x 11in. sheet of paper and may contain hand written formulas and the name of the statistical test for which the formula is used. Do not include worked examples, instructions on how to use a formula, labels for symbols in the formula, written instructions for hypothesis testing, drawings, or anything other than formulas and their names.** The sheet will be checked before the exam and must be submitted with your completed exam. The process of checking formula sheets begins five minutes prior to the official exam start time. Exams must be turned in by the official class end time (no exceptions).

## 4 Disability Services

Students requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP when adequate documentation is filed. Please be sure the letter is delivered to me as early in the semester as possible. DSP is open Monday-Friday, 8:30-5:00, their phone number is (213) 740-0776.

## 5 Academic Integrity

All students are expected to complete their own work, including homework problems, lab assignments, and exams. You are encouraged to ask one another for help in the laboratory sessions, but every student is expected to do his or her own assignments in this class. That includes homework assignments, lab assignments, quizzes, and examinations. The classroom is crowded and it is important that you make sure you keep your eyes on your own exam! For more information on Academic Integrity consult the Trojan Integrity Guide at <http://www.usc.edu/student-affairs/SJACS/forms/tio.pdf>.

## 6 Course Schedule

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

Week	Topics/Activities	Reading	Assignments
Week 1 Th (5/19) Th (5/19)	Introduction Frequency Distributions, & Plotting Data <b>Lab 1: Introduction to R</b>	WCL 1-2	HW 1 (Assigned)
Week 2 Tu (5/24)  Th (5/26)	Central Tendency & Dispersion The Normal Distribution <b>Lab 2: Descriptive Statistics &amp; Plotting Data</b> The Normal Distribution & Statistical Inference <b>Lab 3: Sampling Distributions &amp; Hypothesis Testing</b>	WCL 3 -4  WCL 4-5	HW 1 (Due)  HW 2 (Assigned) Lab 1 (Due)
Week 3 Tu (5/31)  Th (6/2)	Sampling Distributions & Correlation Correlation & Regression <b>Lab 4: Correlation &amp; Regression</b> <b>First Midterm Exam</b> <b>Lab 5: Regression</b>	WCL 5 & 9 WCL 9 -10	HW 2 (Due) HW 3 (Assigned)  Labs 2 & 3 (Due)
Week 4 Tu (6/7)  Th (6/9)	One sample & paired $t$ -tests Independent samples $t$ -tests <b>Lab 6: <math>t</math>-tests</b> Effect Size & Power <b>Lab 7: Effect Size &amp; Power</b>	WCL 6 -7  WCL 11	HW 3 (Due)  HW 4 (Assigned) Labs 4 & 5 (Due)
Week 5 Tu (6/14)  Th (6/16)	Chi-Square Tests One-Way ANOVA <b>Lab 8: Chi-Square &amp; Review</b> <b>Second Midterm Exam</b>	WCL 17 WCL 12	HW 4 (Due) HW 5 (Assigned)

	<b>Lab 9: One-Way ANOVA</b>		Labs 6 & 7 (Due)
Week 6 Tu (6/21)	One-Way and Two-Way ANOVA Multiple Comparisons	WCL 12–14	HW 5 (Due)
Th (6/23)	<b>Lab 10: Two-Way ANOVA</b> Two-Way ANOVA <b>Lab 11: Final Review Session</b>	WCL 14	Labs 8 & 9 (Due)
Week 7 Tu (6/28)	<b>Final Exam</b>		