PSYC 274 - Statistics I
Course Syllabus
Fall 2022

Section 52480D (Lecture section)
52484R & 52486R (Lab sections)

Updated: 24 August 2022

Lecture Meeting Time:	Tu & Th 3:30p - 4:50p
Room:	Waite Phillips Hall (WPH), Room 207
Lab Meeting Times:	Monday (section 52486R) 4:00p - 5:50p
	Wednesday (section 52484R) 4:00p - 5:50p
Room:	Seeley G. Mudd (SGM), Room 631
Instructor:	Christopher R. Beam, Ph.D.
Office:	Seeley G. Mudd (SGM), Room 934
Office Hours:	Tu 9:30a - 10:30a (or by appointment)
Email:	beamc@usc.edu
Teaching Assistant:	Yi Zhang
Office:	Seeley G. Mudd (SGM), Room 810
Office Hours:	M 3:00p - 4:00p (or by appointment)
Email:	yzhang51@usc.edu

Required Materials

Howell, D.C. (2017). *Fundamental statistics for the behavioral sciences (9th Edition)*. Belmont, CA: Wadsworth, Cengage Learning. ISBN-13: 978-1-305-65297-2

Loftus, G. R. (1996). Psychology will be a much better science when we change the way we analyze data. *Current directions in psychological science, 5*(6), 161-171.

Additional readings may be assigned but will be optional.

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, multiple correlation/regression, effect size, confidence intervals, power and sample size, and nonparametric tests for categorical and ranked data.

Statistics I has both lecture and laboratory components. You will learn to use statistical procedures to answer scientific questions in a systematic and convincing manner. Lecture consists of instruction and practice problems. Lab consists of learning to explore and analyze data using R computer software (https://www.r-project.org/).

1.1 Attendance & Participation

USC has resumed full in-person operations. With USC in Phase 5 of Project Restart, in-person attendance is the sole option. It will not be possible to attend lecture or lab remotely.

1.1.1 Lecture

Although attendance in lecture is not documented or graded, attendance is expected. Come to class prepared, already having read the weekly readings. You are responsible for all material covered in the textbook, lecture, and lab. You are expected to participate in class. Course content is introduced gradually and builds on previous sessions. The course is designed to encourage spaced (distributed) learning across multiple modalities (reading, lecture, and lab). (Two research articles on the benefits of spaced learning are available on Blackboard for further reading.) You can master the statistical and methodological concepts covered if you attend lecture and lab, keep up with the readings, and complete all lab and homework problem sets. Please be on-time - arriving late is disruptive to other students and instructors. Do not engage in individual conversations during lecture and lab in order to facilitate others' learning.

1.1.2 Laboratory Sessions

Lab session attendance is mandatory. Attendance will be taken each session by the TA instructor. Failure to attend a lab session will result in 1% lower final grade per missed session. Students are granted a 15-minute grace period in case you are late to lab. Illnesses and emergencies will be excused with sufficient documentation (e.g., physician's note). Athletic events or other extracurricular activities (e.g., clubs, marching band, service organizations) do not qualify as an excused absence from lab unless specifically sanctioned by USC administration. Schedule accordingly to make sure you attend each lab session.

Each session will consist of instruction on how to use R software to execute statistical

procedures and interpret results. The learning curve on R is steep at first, so if you find yourself struggling with the assignments, meet with Dr. Beam or your TA for additional help as soon as possible to target any issues.

1.2 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. Weekly problem sets and lab assignments will be posted on Blackboard. 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 scheduled final examination period.

1.3 Electronic Devices Policy

Graphing calculators and calculator apps on smartphones are prohibited from use on knowledge check quizzes for the simple reasons that they can connect to the internet and/or store data to automate computation. Simple calculators and basic scientific calculators with a memory function are permitted. Infractions on knowledge check quizzes will incur a 2%-point reduction from your final grade plus immediate dismissal from class without possibility of completing the knowledge check quiz.

1.4 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/, although you will find a great deal of R documentation publicly available online.

2 Student Evaluation

Course grades are earned and will be determined based on the following:

Assignment or Examination	Points	Percentage Contribution
Knowledge Check (KC) #1	25	10%
Knowledge Check (KC) #2	25	10%
Knowledge Check (KC) #3	25	10%
Knowledge Check (KC) #4	25	10%
Knowledge Check (KC) #5	50	20%
Weekly Problem Sets (WPS)	130	20%
Laboratory Assignments (LA)	140	20%
Total Grade Basis	420	**100%**

Course letter grades are based on the percentage of points earned (traditional rounding rules 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: $\leq 59.99\%$

Course grades are based on the ratio of the number of points earned out of 420 possible points. Dr. Beam does not normalize or recenter grade distributions (i.e., grade on a curve). For a nice argument against the practice of curving, please see: https://academics.hamilton.edu/biology/smiller/curve.html.

Address all grade concerns early in the semester rather than later in the semester. Extra credit is not offered.

2.1   Homework & Lab Assignments

Weekly problem sets consist of five question: two conceptual questions and three computational questions. Each problem is designed to: 1) instruct thinking about the concepts behind statistical reasoning with a particular focus on making inferences in the context of uncertainty; and 2) develop statistical computation skills. Each homework assignment is worth 10 points and due in person at the beginning of lecture. There are 13 problems sets, so 130 possible points that constitute 20% of your earned course grade. Assignments may be hand written or typed. Assignments are graded for accuracy. Problem sets will be returned to you by the next lecture.

Lab assignments are worth 10 points each. Lab assignments will be completed in the R software package. Completed R files must be turned in via your lab section Blackboard site. There are 14 lab assigments, so 140 possible points that constitute 20% of your earned course grade. Lab assignments are graded for accuracy. Lab assignments must be submitted before the beginning of your next lab session. Laboratory assignments will be graded and returned by the following laboratory session.

Late problem sets and lab assignments will not be accepted apart from illness, emergency, or university-sponsored events. Acceptable documentation must be provided to and approved by Dr. Beam. Late assignments that meet one of the above criteria must be turned in by a date and time approved by Dr. Beam.

2.2   Knowledge Check Quizzes

Knowledge check quizzes include conceptual and computational (calculation) problems. There are five knowledge checks in total that combine to 150 points and constitute a total of 65% of your earned course grade. Knowledge checks are spaced about every 3 weeks with purpose of keeping you abreast of recently covered content. Knowledge checks are not cumulative, although statistical content inevitably will carry over from previously learned material. A hand calculator that has a memory and can take

square roots is needed for computational problems. Be sure to bring a calculator, as they may not be shared. Graphing calculators and calculator apps on smartphones are prohibited from use on knowledge checks for the simple reasons that they can connect to the internet and/or store data to automate computation. Knowledge checks are closed book.

2.3 Makeup Policy

Students who are ill - due to COVID-19 or any other pathogen - should not attend lecture or lab. Please notify Dr. Beam and your TA if you are ill. We will work with students on a case-by-case basis to provide you with lecture notes and to schedule make-up problem sets and knowledge check quizzes as needed. It is always a good idea to partner with another student (or students) in the class to share lecture and lab notes.

3 Academic Integrity

All students are expected to complete their own work, including problem sets, lab assignments, and knowledge check quizzes. You are encouraged to ask one another for help in the laboratory sessions, but students are expected to complete and turn in their own work. For more information on Academic Integrity consult the Trojan Integrity Guide at http://www.usc.edu/student-affairs/SJACS/forms/tio.pdf. If you are caught cheating (regardless of level of involvement), you will automatically fail the course and a report will be filed with USC's Office of Student Judicial Affairs and Community Standards.

4 Statement on Academic Conduct and Support Systems

4.1 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 Research and Scholarship Misconduct.

4.2 Students and Disability Accommodations

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial

appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Students who elect to use their acommodations for knowledge check quizzes will be administered their quizzes through OSAS.

4.3 Support Systems

Counseling and Mental Health - (213) 740-9355 - 24/7 on call
studenthealth.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) 740-9355(WELL), press "0" after hours - 24/7 on call
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086
eeotix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776
osas.usc.edu
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - (213) 821-4710
campussupport.usc.edu

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

Diversity, Equity and Inclusion - (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.

Office of the Ombuds - (213) 821-9556 (UPC) / (323) 442-0382 (HSC)
ombuds.usc.edu
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-3340 or otfp@med.usc.edu
chan.usc.edu/otfp
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.

5 Course Schedule

A schedule of dates, topics and readings are shown below. Weekly problem set and lab assignment due dates are given in the righthand column. Problem sets are due at the beginning of class. Lab assignments are due at the beginning of each laboratory session.

Week	Topics/Activities	Reading	Due Dates
Week 1			
Tu (8/23)	Syllabus & Scales of Measurement	Howell 1-2	
Th (8/25)	Frequency Distributions & Plotting Data	Howell 3	
Lab			
Mon.	**Lab 1: Getting to know R**		
Wed.	**Lab 1: Getting to know R**		
Week 2			
Tu (8/30)	Describing Data: Central Tendency & Dispersion	Howell 4-5	PS #1
Th (9/1)	Dispersion	Howell 4-5	
Lab			
Mon.	**Lab 2: Getting to know R better**		Lab 1
Wed.	**Lab 2: Getting to know R better**		Lab 1
Week 3			
Tu (9/6)	The Normal Distribution	Howell 6	PS #2
Th (9/8)	Knowledge Check #1		
Lab			
Mon.	**No lab (Labor Day)**		
Wed.	**Lab 3: Plot functions**		Lab 2
Week 4			
Tu (9/13)	Probability & Sampling Distributions	Howell 7-8	PS #3
Th (9/15)	Sampling Distributions & NHST	Howell 7-8	
Lab			
Mon.	**Lab 3: Plot functions**		Lab 2
Wed.	**Lab 4: Using R to understand sampling distributions**		Lab 3
Week 5			
Tu (9/20)	Wrapping up Sampling Distributions & NHST	Howell 8, Loftus (1996)	PS #4
Th (9/22)	NHST & Correlation	Howell 9	
Lab			
Mon.	**Lab 4: Using R to understand sampling distributions**		Lab 3
Wed.	**Lab 5: Bivariate data analysis in R (Correlation)**		Lab 4
Week 6			
Tu (9/27)	Correlation & Regression (conceptual)	Howell 9 -10	PS #5

Th (9/29)	Knowledge Check #2		
Lab			
Mon.	**Lab 5: Bivariate data analysis in R (Correlation)**		Lab 4
Wed.	**Lab 6: Bivariate data analysis in R (Regression)**		Lab 5
Week 7			
Tu (10/4)	Bivariate Regression	Howell 9-10	
Th (10/6)	Multiple Correlation & Regression	Howell 9-10	PS #6
Lab			
Mon.	**Midsemester R Review (no problem set)**		
Wed.	**Midsemester R Review (no problem set)**		
Week 8			
Tu (10/11)	One more session on regression	Howell 11	PS #7
Th (10/13)	Fall Recess (No lecture)		
Lab			
Mon.	**Lab 6: Bivariate data analysis in R (Regression)**		Lab 5
Wed.	**Lab 7: Multivariate data analysis in R (Multiple Regression)**		Lab 6
Week 9			
Tu (10/18)	One-sample t-tests	Howell 12-14	
Th (10/20)	Knowledge Check #3		
Lab			
Mon.	**Lab 7: Multivariate data analysis in R (Multiple Regression)**		Lab 6
Wed.	**Lab 8: Testing differences (One-sample t-tests)**		Lab 7
Week 10			
Tu (10/25)	Paired samples t-tests	Howell 12-14	PS #8
Th (10/27)	Independent samples t-tests	Howell 12-14	
Lab			
Mon.	**Lab 8: Testing differences (One-sample t-tests)**		Lab 7
Wed.	**Lab 9: Testing differences (Paired samples t-tests)**		Lab 8
Week 11			
Tu (11/1)	One more session on t-tests		PS #9
Th (11/3)	Categorical Outcomes	Howell 19	
Lab			
Mon.	**Lab 9: Testing differences (Paired samples t-tests)**		Lab 8
Wed.	**Lab 10: Testing differences (Independent samples t-tests)**		Lab 9
Week 12			

Tu (11/8) Th (11/10) **Lab** Mon. Wed.	Effect Size & Power Knowledge Check # 4 **Lab 10: Testing differences (Independent samples _t_-tests)** **Lab 11: Categorical data analysis**	Howell 15	PS #10 Lab 9 Lab 10
Week 13 Tu (11/15) Th (11/17) **Lab** Mon. Wed.	 Power Analysis of Variance (conceptual) **Lab 11: Categorical data analysis** **Lab 12: Power**	Howell 15 Howell 16	PS #11 Lab 10 Lab 11
Week 14 Tu (11/22) Th (11/24) **Lab** Mon. Wed.	 Analysis of Variance Thanksgiving Holiday (No lecture) **Lab 12: Power** **No lab (Thanskgiving Holiday)**	Howell 16	PS #12 Lab 11
Week 15 Tu (11/29) Th (12/1) Mon. Wed.	 Analysis of Variance One more session on ANOVA **Lab 13: ANOVA** **Lab 13: ANOVA**	Howell 17 Howell 18	PS #13 Lab 12 Lab 12
Week 16 Tu (12/13)	**Knowledge Check #5** (2:00-4:00PM in WPH 207) **Note change in meeting time**		Lab 13