

BISC 305: Statistics for the Biological Sciences

Lectures: T and Th, 11:00 AM – 12:20 PM, VKC 101

Discussion: M or W, 1:00 – 1:50 PM, RRI 301

Instructor: Peter Calabrese, petercal@usc.edu, 213-740-2434, RRI 403F

Office hours: T 3:00 – 5:00 PM, or by appointment

Teaching Assistant: Saket Choudhary, skchoudh@usc.edu, 213-821-3990, RRI 408D

Office hours: T 5:00 – 6:00 PM, Th 9:00 – 10:00 AM

Course Content

Statistics for the Biological Sciences is an introductory course in statistics addressed to students in the life sciences. The learning objective is to illustrate statistical reasoning in biological science and medicine. The students will learn probability models, experimental design, statistical analyses, and interpretation of results. The course uses real data from life sciences.

Textbook

Statistics for the Life Sciences by M.L. Samuels, J.A. Witmer and A. Schaffner. Prentice Hall, 5th Edition.

Grading

There are two mid-term examinations (15% each), a quiz each Thursday (15%), and a final examination (35%). All examinations will occur as scheduled below: there will be no make-up examinations. Note particularly that university regulations strictly regulate the final examination date and time. In addition, there will be homework assignments (10%) and two data analysis projects (5% each). It is important that students do the homework: I believe that students learn the most when working on the homework. A 50% grade deduction will be imposed for late homework, and no homework later than one week will be accepted.

	Date	Topic
Wk. 1	08/27/19	Introduction. Chapter 1, 1-26
	08/29/19	Description of Samples and Populations. Chapter 2, 27-39
Wk. 2	09/03/19	Description of Samples and Populations. Chapter 2, 40-59
	09/05/19	Description of Samples and Populations. Chapter 2, 59-67
Wk. 3	09/10/19	Description of Samples and Populations. Chapter 2, 68-82, Probability and the Binomial Distribution. Chapter 3, 83-87
	09/12/19	Probability and the Binomial Distribution. Chapter 3, 88-98

- Wk. 4 09/17/19 Probability and the Binomial Distribution. Chapter 3, 99-115
09/19/19 The Normal Distribution. Chapter 4, 122-133
- Wk. 5 09/24/19 The Normal Distribution. Chapter 4, 133-140
Sampling Distribution. Chapter 5, 146-159
09/26/19 Confidence Intervals. Chapter 6, 171-193
- Wk. 6 10/01/19 Confidence Intervals. Chapter 6, 193-208,211-222
10/03/19 **First Midterm**
- Wk. 7 10/08/19 Comparing of Two Independent Samples. Chapter 7, 223-240
10/10/19 Comparing of Two Independent Samples. Chapter 7, 241-249
- Wk. 8 10/15/19 Association and causation, one-side t-test. Chapter 7, 250-267
10/17/19 Fall recess
- Wk. 9 10/22/19 Statistical significance, hypothesis testing principles,
Chapter 7, 268-275, 281-290
10/24/19 The Wilcoxon-Mann-Whiney test, Chapter 7, 291-306
- Wk. 10 10/29/19 Paired sample t-test and confidence interval, Chapter 8, 307-318
10/31/19 Paired sample signed test, Chapter 8, 325-337
- Wk. 11 11/05/19 Categorical data, estimation of proportion, Chapter 355-365
11/07/19 Categorical data, goodness-of-fit, Chapter 9, 368-382
- Wk. 12 11/12/19 Categorical data, relationships, Chapter 10, 383-401, 407-412
11/14/19 **Second Midterm**
- Wk. 13 11/19/19 Many Samples, ANOVA, Chapter 11, 442-454
11/21/19 Many samples, one and two-way ANOVA,
Chapter 11, 455-465, 478-487
- Wk. 14 11/26/19 Regression, correlation, Chapter 12, 511-524
11/28/19 Thanksgiving
- Wk. 15 12/03/19 Regression, linear model, Chapter 12, 525-536
12/05/19 Regression, linear model guidelines, Chapter 12, 537-560

Final Exam: Dec 17, 8am-10am

Statement on Academic Conduct and Support Systems

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.

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.