

BISC 305: Statistics for the Biological Sciences

Lectures: T and Th, 11:00 AM – 12:20 PM, GFS 118

Discussion: M or W, 1:00 – 1:50 PM, RRI 321

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

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

Teaching Assistant:

Office hours:

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	01/14/20	Introduction. Chapter 1, 1-26
	01/16/20	Description of Samples and Populations. Chapter 2, 27-59
Wk. 2	01/21/20	Description of Samples and Populations. Chapter 2, 59-82
	01/23/20	Lecture on R (bring your laptops)
Wk. 3	01/28/20	Probability and the Binomial Distribution. Chapter 3, 83-93
	01/30/20	Probability and the Binomial Distribution. Chapter 3, 94-102
Wk. 4	02/04/20	Probability and the Binomial Distribution. Chapter 3, 102-115

- 02/06/20 The Normal Distribution. Chapter 4, 122-140
- Wk. 5 02/11/20 Sampling Distribution. Chapter 5, 146-169
02/13/20 Confidence Intervals. Chapter 6, 171-204
- Wk. 6 02/18/20 Confidence Intervals. Chapter 6, 205-208,211-222
Poisson distribution and bootstrap (not in textbook)
02/20/20 **First Midterm**
- Wk. 7 02/25/20 Comparing of Two Independent Samples. Chapter 7, 223-248
02/27/20 Comparing of Two Independent Samples. Chapter 7, 249-275
- Wk. 8 03/03/20 The Wilcoxon-Mann-Whiney test, Chapter 7, 281-306
03/05/20 Paired sample t-test and confidence interval, Chapter 8, 307-318
- Wk. 9 03/10/20 Paired sample non-parametric tests, Chapter 8, 325-337
03/12/20 Interpretation, Chapter 8, 336-340
Categorical data, estimation of proportion, Chapter 9, 355-365
- SPRING BREAK MARCH 15-22
- Wk. 10 03/24/20 Categorical data, goodness-of-fit, Chapter 9, 368-382
03/26/20 Categorical data, relationships, Chapter 10, 383-401, 407-412
- Wk. 11 03/31/20 Many Samples, ANOVA, Chapter 11, 442-454
04/02/20 Many Samples, one and two-way ANOVA,
Chapter 11, 455-465, 478-487
- Wk. 12 04/07/20 Review
04/09/20 **Second Midterm**
- Wk. 13 04/14/20 Regression, correlation, Chapter 12, 511-524
04/16/20 Regression, linear model, Chapter 12, 525-536
- Wk. 14 04/21/20 Regression, linear model guidelines, Chapter 12, 537-560
04/23/20 Multivariate analysis (not in textbook)
- Wk. 15 04/28/20 Multivariate analysis (not in textbook)
04/30/20 Review

Final Exam: May 12, 11am-1pm

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/sssa

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.