

BISC 305: Statistics for the Biological Sciences

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

Discussion: M or W, 1:00 – 1:50 PM

Instructor: Peter Calabrese, petercal@usc.edu

Office hours:

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. In addition, students will be introduced to R (a free computer program for statistical computing and graphics).

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 on some Thursdays (10%), 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. In addition, there will be weekly homework assignments (15%) 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	08/24/21	Introduction. Chapter 1, 1-26
	08/26/21	Description of Samples and Populations. Chapter 2, 27-59
Wk. 2	08/31/21	Description of Samples and Populations. Chapter 2, 59-82
	09/02/21	Probability and the Binomial Distribution. Chapter 3, 83-93
Wk. 3	09/07/21	Probability and the Binomial Distribution. Chapter 3, 94-102
	09/09/21	Lecture on R

- Wk. 4 09/14/21 Probability and the Binomial Distribution. Chapter 3, 102-115
 09/16/21 The Normal Distribution. Chapter 4, 122-140
- Wk. 5 09/21/21 Sampling Distribution. Chapter 5, 146-169
 09/23/21 Confidence Intervals. Chapter 6, 171-204
- Wk. 6 09/28/21 Confidence Intervals. Chapter 6, 205-208, 211-222
 Poisson distribution and bootstrap (not in textbook)
 09/30/21 **First Midterm**
- Wk. 7 10/05/21 Comparing of Two Independent Samples. Chapter 7, 223-248
 10/07/21 Comparing of Two Independent Samples. Chapter 7, 249-275
- Wk. 8 10/12/21 The Wilcoxon-Mann-Whiney test, Chapter 7, 281-306
 10/14/21 **Fall recess (no class)**
- Wk. 9 10/19/21 Paired sample t-test and confidence interval, Chapter 8, 307-318
 10/21/21 Paired sample non-parametric tests, Chapter 8, 325-337
- Wk. 10 10/26/21 Interpretation, Chapter 8, 336-340
 Categorical data, estimation of proportion, Chapter 9, 355-365
 10/28/21 Categorical data, goodness-of-fit, Chapter 9, 368-382
- Wk. 11 11/02/21 Categorical data, relationships, Chapter 10, 383-401, 407-412
 11/04/21 Many Samples, ANOVA, Chapter 11, 442-454
- Wk. 12 11/09/21 Many Samples, one and two-way ANOVA,
 Chapter 11, 455-465, 478-487
 11/11/21 **Second Midterm**
- Wk. 13 11/16/21 Regression, correlation, Chapter 12, 511-524
 11/18/21 Regression, linear model, Chapter 12, 525-536
- Wk. 14 11/23/21 Regression, linear model guidelines, Chapter 12, 537-560
 11/25/21 **Thanksgiving (no class)**
- Wk. 15 11/30/21 Multivariate analysis (not in textbook)
 12/02/21 Review

Final Exam: Tuesday, December 14, 8 – 10 am

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:

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 of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298

equity.usc.edu, titleix.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 of Equity and Diversity |Title IX for appropriate investigation, supportive measures, 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 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 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.

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 con