



QBIO 305 Statistics for Biological Sciences

Units: 4

Fall 2022 Semester

Lecture: Tuesdays and Thursdays, 11:00 – 12:20pm

Location: ZHS 252

Discussion: Mondays, 1:00 – 1:50pm

or Mondays, 2:00 – 2:50

or Wednesdays, 1:00 – 1:50pm

or Wednesdays, 2:00 – 2:50pm

Location: TBD

Instructor: Peter Calabrese

Office: RRI 404B

Office Hours: Mondays, 3:30 – 4:30pm,

Tuesdays, 12:30 – 1:30pm,

Wednesdays, 3:30 – 4:30pm,

or by appointment

Contact Info: petercal@usc.edu, 213-740-2434

For office hours, I will be in my office and I will also be on Zoom (<https://usc.zoom.us/j/4898518195>). It is up to you if you want to meet in person or online

Teaching Assistants:

TBD

Course Description

Statistics for Biological Sciences is an introductory course in statistics addressed to students in the life sciences. The course uses real data from life sciences. Understanding statistics is essential for studying modern biology.

Learning Objectives

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

Prerequisite(s): none

Co-Requisite(s): none

Concurrent Enrollment: none

Recommended Preparation: none

Course Notes

This course can be taken either for a letter grade or for credit/no credit. Homework assignments and lecture slides will be posted on Blackboard.

Technological Proficiency and Hardware/Software Required

Students will be introduced to R (a free computer program for statistical computing and graphics), so students will need a computer. In addition, students will need a calculator (any type).

Required Readings and Supplementary Materials

Statistics for the Life Sciences by M.L. Samuels, J.A. Witmer and A. Schaffner. Prentice Hall, 5th Edition. This textbook can be purchased at the campus store.

Description and Assessment of Assignments

There will be weekly homework, quizzes most weeks, two R projects, two midterm exams, and one final exam.

Grading Breakdown

Assessment Tool (assignments)	Points	% of Grade
Homework (lowest one dropped)		20
Quizzes (lowest one dropped)		15
R projects		10
Midterm Exam 1		15
Midterm Exam 2		15
Final Exam		25
TOTAL		100

Assignment Submission Policy

Homework will be due on Tuesdays. Quizzes will be on Thursdays. R Projects and exams will be due on the days specified.

Grading Timeline

Homework, quizzes, R projects, and exams will be graded within one week of submission. Grades will be entered on Blackboard.

Additional Policies

You can work together on the HW (every student must submit their own assignment). You cannot work together on the quizzes or exams. A 50% grade deduction will be imposed for late homework, and no homework later than one week will be accepted. All examinations will occur as scheduled: there will be no make-up examinations. Note particularly that university regulations strictly regulate the final examination date. The professor reserves the right to make changes to the syllabus; these changes will be announced as early as possible so that students can adjust their schedules.

Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	Readings/Preparation	Deliverables
Week 1	Introduction, Chapter 1 Chapter 2, Description of Samples and Populations	pp 1 – 26 pp 27 – 59	(no homework) (no quiz)
Week 2	Chapter 2, Description of Samples and Populations Chapter 3, Probability and Binomial Distribution	pp 59 – 82 pp 83 – 93	Homework Quiz
Week 3	Chapter 3, Probability and Binomial Distribution Chapter 3, Probability and Binomial Distribution	pp 94 – 102 pp 102 – 115	Homework Quiz
Week 4	Chapter 4, Normal Distribution Chapter 5, Sampling Distribution	pp 122 – 140 pp 146 – 169	Homework Quiz
Week 5	Lecture on R Chapter 6, Confidence Intervals	pp 171 – 204	Homework Quiz
Week 6	Chapter 6, Confidence Intervals; Poisson and Bootstrap (not in textbook) First Midterm Exam	pp 205 – 208, 211 – 222	Homework First Midterm Exam
Week 7	Chapter 7, Comparing Two Independent Samples Chapter 7, Comparing Two Independent Samples	pp 223 – 248 pp 249 – 275	Homework (no quiz)
Week 8	Chapter 7, Wilcoxon-Mann-Whitney Test Fall break (no class)	pp 281 – 306	Homework
Week 9	Chapter 8, Paired t-test Chapter 8, Paired non-parametric tests	pp 307 – 318 pp 325 – 337	Homework R Project #1 (no quiz)
Week 10	Chapter 8, Aggregate viewpoint; Chapter 9, Estimate of Proportion Chapter 9, Goodness-of-fit	pp 336 – 340, 355 – 365 pp 368 – 382	Homework Quiz
Week 11	Chapter 10, Relationships Chapter 11, ANOVA	pp 383 – 401, 407 – 412 pp 442 – 454	Homework Quiz
Week 12	Chapter 11, ANOVA Second Midterm Exam	pp 455 – 465, 478 – 487	Homework Second Midterm Exam
Week 13	Chapter 12, Correlation Chapter 12, Linear Model	pp 511 – 524 pp 525 – 536	Homework (no quiz)
Week 14	Chapter 12, Guidelines Thanksgiving (no class)	pp 537 – 560	Homework
Week 15	Multivariate analysis (not in textbook) Multivariate analysis (not in textbook)		Homework R Project #2 (no quiz)
FINAL EXAM	Tuesday, December 13, 8:00 – 10:00am		

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.