



USC

QBIO 305g Statistics for Biological Sciences

Units: 4

Fall 2024 Semester

Lecture: Mondays & Wednesdays 14:00-15:20; SOS B46

Discussion: Tuesdays 9:00-9:50 RRI 421

Tuesdays 10:00-10:50 RRI 421

Thursdays 14:00-14:50 RRI 301

Thursdays 15:00-15:50 RRI 301

Instructor: Dr. Matt Pennell

Office: RRI 416J

Office Hours: Thursdays 12:30-13:20

Contact Info: mpennell@usc.edu

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 Enrolment: None

Recommended Preparation: None

Course Notes

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

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

There is no required textbook for this course. However, it would be helpful to have access to one of these textbooks to complement the materials taught in class.

The Analysis of Biological Data by M.C. Whitlock, and D. Schluter. Macmillan Learning, 3rd edition. This textbook can be purchased online. (Recommended.)

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 a weekly set homework of homework problems. Most weeks there will also an R assignment. In addition, there will be two midterm exams and one final exam.

Grading Breakdown

Assessment Tool (assignments)	% of Grade
Homework assignments	15
R assignments	10
Midterm 1	20
Midterm 2	20
Final	35
TOTAL	100

Assignment Submission Policy

Both homework and R assignments will be due at **13:59 on Wednesdays** (i.e., right before lecture). They are to be submitted via Brightspace. In general, late homework and R assignments will not be graded. However, we understand that life happens and that some weeks it will be difficult to complete the work on time; if extenuating circumstances do arise, please email the instructor and we will consider exceptions on a case-by-case basis.

Grading Timeline

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

Additional Policies

You can work together on the Homework and the R assignments (every student must submit their own assignment). You **cannot** work together on the exams. 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	Deliverables
Week 1 Aug 26	Introduction Samples and Populations Note: No Discussion for Week 1	No HW due No R assign due
Week 2 Sept 2	Probability Note: No Class Monday (Labor Day)	HW 1 due No R assign due
Week 3 Sept 9	Probability Binomial Distribution	HW 2 due R assign 1 due
Week 4 Sept 16	Normal Distribution Sampling Distribution	HW 3 due R assign 2 due
Week 5 Sept 23	Hypothesis Testing t -distribution	HW 4 due R assign 3 due
Week 6 Sept 30	Midterm Review Midterm 1 — October 2nd	HW 5 due R assign 4 due
Week 7 Oct 7	Comparing Two Independent Samples Comparing Two Independent Samples	No HW due No R assign due
Week 8 Oct 14	Dealing with violations Fitting frequency data	HW 6 due R assign 5 due
Week 9 Oct 21	Contingency ANOVA	HW 7 due R assign 6 due
Week 10 Oct 28	Correlation Linear regression intro	HW 8 due R assign 7 due
Week 11 Nov 4	Midterm Review Midterm 2 — November 6th	HW 9 due R assign 8 due
Week 12 Nov 11	Linear regression cont. Note: No Class Monday (Veteran's Day)	No HW due No R assign due
Week 13 Nov 18	Causal inference Causal inference	HW 10 due R assign 9 due
Week 14 Nov 25	Multiple regression Note: No class Nov 27 (Thanksgiving)	No HW due No R assign due
Week 15 Dec 2	Modern computational techniques	HW 11 due R assign 10 due

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
equity.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.

Title IX – (213) 821-8298
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
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.