

BISC 305: Statistics for the Biological Sciences (tentative)

Lectures: TTh 11:00-12:20PM Online
Discussion: M or W 1:00-1:50 PM Online

Instructor

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Teaching Assistant

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Course Description

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 be able to use probability models, experimental design, statistical analyses, interpretation of results, and basic R programming to solve biological problems. 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), seven quizzes (15%), and a final examination (25%). Each quiz covers materials from the previous week. 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 (20%) and two data analysis R-projects (5% each). Homework and project-based assignments are to be the independent work of each individual student although students can seek help from others. Homework assignments are due by midnight on Tuesdays. Quizzes will be taken in class in synchronous sessions and they can also be taken at a different time on the same day in Blackboard. Midterms and the final will be due by midnight of the day they are scheduled. A 50% grade deduction will be imposed for late homework, quizzes, midterms and final, and no work later than one week will be accepted.

Homework Assignments, Projects, Quizzes, Midterm and Final Exams

You are encouraged to seek help from others including your fellow classmates, TA and the instructor for homework assignments and projects. However, the final work must be done by yourself. It is highly important that students practice many times for statistical concepts and methods to really learn the materials.

All the quizzes and exams will be on the honor system. You can use textbooks, lecture notes, calculators and computers. *However, you are not allowed to seek help from others.* The submitted work must be

done by yourself. If there are some evidences of violating USC scientific integrity rules, both the help provider and the recipient will receive zero credits for the relevant quizzes and exams.

Office Hours and Discussion Board

You are encouraged to post questions to the “Discussion Board” under the “Tools” option in Blackboard. The TA and instructor will monitor the board and answer questions from there so that all students can see the answers. If you would like to seek help from the TA or instructor personally, please email them to make an appointment. They will arrange personal zoom meetings for the students at mutual convenient time.

Free R-program

The course will use R, a free statistical package, for some of the projects. You can download the R-program at <https://cran.r-project.org/>. Rstudio <https://rstudio.com/>

Assignment Submission

You will be using Blackboard to turn in your assignments/quizzes/exams. For every homework, a *turnitin* link will be made available. Please make sure you check the due dates for each assignment/quiz/exam. You can either do your homework on pen and paper and then upload its scanned version or if you have access to an iPad or a Microsoft Surface or anything equivalent, you can use any supported writing application to write your homework on the divide and then upload the PDF. The below sections provide instructions for both the modes.

Option 1: Scanning your homework using your Phone device

If you prefer doing your homework using a pen/pencil and paper, you can use your phone as the scanning device to convert it into a digital format that can be uploaded via *turnitin*. We recommend the ‘Adobe scan’ app for scanning your homeworks :

- Apple: <https://apps.apple.com/us/app/adobe-scan-digital-pdf-scanner/id1199564834>
- Android: https://play.google.com/store/apps/details?id=com.adobe.scan.android&hl=en_US

Please note that this app can be used free of cost. Once you install the app, the rest of the steps are straightforward. You should be able to take pictures of your homework page by page and then create one PDF out of it. You can read detailed instructions here: <https://www.adobe.com/devnet-docs/adobescan/android/en/scan.html#scanning-quick-steps>

Option 2: Using iPad/Surface/Writing device

If you are using an iPad or Microsoft surface or any other writing device (with a stylus or equivalent) you can use any of the following apps:

iPad:

- Apple Notes: <https://apps.apple.com/us/app/notes/id1110145109#?platform=ipad>
- One Note: <https://apps.apple.com/us/app/microsoft-onenote/id410395246>
- PDF Viewer: <https://apps.apple.com/us/app/pdf-viewer-annotation-expert/id1120099014>

Microsoft Surface:

- One Note (inbuilt): <https://www.onenote.com/>
- Bamboo Paper: <https://www.microsoft.com/en-us/p/bamboo-paper/9wzdnrcfj1bh>

You should be able to export a PDF from these writing apps once you finish writing your homework. The PDF can then be uploaded on *turnitin*.

All the apps mentioned above available for free.

USC Technology Support Links

[Zoom information for students](#)

[Blackboard help for students](#)

[Software available to USC Campus](#)

Zoom etiquette

During the class, please mute your microphone when you are not talking to minimize noise. Students are encouraged to ask questions through the “chat” button or “raise hand” option within the “participants” button. The instructor and TA will let the students talk and answer the questions at appropriate time.

You are encouraged to keep the camera on.

Zoom Invite:

Synchronous session recording notice

The synchronous sessions will be recorded and provided to all students asynchronously. Please do not share private information during the synchronous sessions.

Sharing of course materials outside of the learning environment is prohibited

USC has a policy that prohibits sharing of any synchronous and asynchronous course content outside of the learning environment.

SCampus Section 11.12(B)

Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes, but is not limited to, providing materials for distribution by services publishing class notes. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

Course evaluation

Course evaluation occurs at the end of the semester university-wide. It is an important review of students' experience in the class. The process and intent of the end-of-semester evaluation should be provided.

Course Schedule

(Note: page numbers maybe different depending on the version of the textbook you have.)

	Date	Topic
Wk. 1	1/19/21	Introduction. Chapter 1, 1-26
	1/21/21	Description of Samples and Populations. Chapter 2, 27-59
Wk. 2	1/26/21	Description of Samples and Populations. Chapter 2, 59-82
	1/28/21	Probability and the Binomial Distribution. Chapter 3, 83-93 <i>Quiz 1</i>
Wk. 3	2/02/21	Probability and the Binomial Distribution. Chapter 3, 94-102
	2/04/21	Lecture on R
Wk. 4	2/09/21	Probability and the Binomial Distribution. Chapter 3, 102-115
	2/11/21	The Normal Distribution. Chapter 4, 122-140 <i>Quiz 2</i>
Wk. 5	2/16/21	Sampling Distribution. Chapter 5, 146-169
	2/18/21	Confidence Intervals. Chapter 6, 171-204 <i>Quiz 3</i>

Wk. 6	2/23/21	Confidence Intervals. Chapter 6, 205-208, 211-222 Poisson distribution (not in textbook)
	2/25/21	First Midterm
Wk. 7	3/02/21	Comparing of Two Independent Samples. Chapter 7, 223-248
	3/04/21	Comparing of Two Independent Samples. Chapter 7, 249-275
Wk. 8	3/09/21	The Wilcoxon-Mann-Whiney test, Chapter 7, 281-306
	3/11/21	Paired sample t-test and confidence interval, Chapter 8, 307-318 <i>Quiz 4</i>
Wk. 9	3/16/21	Paired sample non-parametric tests, Chapter 8, 325-337
	3/18/21	Interpretation, Chapter 8, 336-340 Categorical data, estimation of proportion, Chapter 9, 355-365 <i>Quiz 5</i>
Wk. 10	3/23/21	Wellness Day
	3/25/21	Categorical data, goodness-of-fit, Chapter 9, 368-382 <i>R-project 1 due</i>
Wk. 11	3/30/21	Categorical data, relationships, Chapter 10, 383-401, 407-412
	4/01/21	Many Samples, ANOVA, Chapter 11, 442-454 <i>Quiz 6</i>
Wk. 12	4/06/21	Many samples, one and two-way ANOVA, Chapter 11, 455-465, 478-487
	4/08/21	Second Midterm
Wk. 13	4/13/21	Regression, correlation, Chapter 12, 511-524
	4/15/21	Regression, linear model, Chapter 12, 525-536 <i>Quiz 7</i>
Wk. 14	4/20/21	Regression, linear model guidelines, Chapter 12, 537-560
	4/22/21	Wellness Day
Wk. 15	4/27/21	Model selection and multivariate regression (not in the textbook)
	4/29/21	Class Review <i>R-project 2 due</i>

Final Exam: Tuesday, May 11, 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:

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.symlicity.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.