

BISC 305: Statistics for Biological Sciences

Lectures (session 13032R): TTh 5:00-6:20 PM

Discussion: MW 1:00-1:50 PM

Instructor

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TBA

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Course Description

Statistics for 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 and collaborate with others. Homework assignments are due by midnight on Tuesdays. Quizzes, midterms and the final will be taken in class. A 50% grade deduction will be imposed for late homework and projects and no work later than one week will be accepted. One homework and one quiz with the lowest score will be dropped in calculating the final course grade.

Homework Assignments, Projects, Quizzes, Midterm and Final Exams

You are encouraged to seek help from others including your fellow classmates, TA and the instructor and collaborate with your classmates 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.

You can use textbooks, lecture notes, and calculators for quizzes and exams. *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 according to USC regulations.

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 homework assignments and projects. For every homework, a *turnitin* link will be made available. Please make sure you check the due dates for each assignment and project. 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 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/9wzdncrfj1bh>

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 are available for free.

USC Technology Support Links

[Zoom information for students](#)

[Blackboard help for students](#)

[Software available to USC Campus](#)

Sharing of course materials outside of the learning environment is prohibited

USC has a policy that prohibits sharing of any 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 text book you have.)

	Date	Topic
Wk. 1	08/24	Introduction. Chapter 1, 1-26
	08/26	Description of Samples and Populations. Chapter 2, 27-39
Wk. 2	08/31	Description of Samples and Populations. Chapter 2, 40-59
	09/02	Description of Samples and Populations. Chapter 2, 59-67 <i>Quiz 1</i> (covering materials from Aug. 24 and 26)
Wk. 3	09/07	Description of Samples and Populations. Chapter 2, 68-82, Probability and the Binomial Distribution. Chapter 3, 83-87
	09/09	Probability and the Binomial Distribution. Chapter 3, 88-98 <i>Quiz 2</i> (covering materials from Aug. 31 and Sept. 2)
Wk. 4	09/14	Probability and the Binomial Distribution. Chapter 3, 99-115
	09/16	The Normal Distribution. Chapter 4, 122-133

Quiz 3 (covering materials from Sep. 7 and 9)

Wk. 5	09/21	The Normal Distribution. Chapter 4, 133-140 Sampling Distribution. Chapter 5, 146-159
	09/23	First Midterm (covering materials until Sept. 21th)
Wk. 6	09/28	Confidence Intervals. Chapter 6, 171-193
	09/30	Confidence Intervals. Chapter 6, 193-208,211-222
Wk. 7	10/05	Comparing of Two Independent Samples. Chapter 7, 223-249
	10/07	Association and causation, one-side t-test. Chapter 7, 250-267 <i>Quiz 4 (covering materials from Sept. 28 and 30)</i>
Wk. 8	10/12	Statistical significance, hypothesis testing principles, Chapter 7, 268-290
	10/14	Fall Recess
Wk. 9	10/19	The Wilcoxon-Mann-Whiney test, Chapter 7, 291-306
	10/21	Paired sample t-test and confidence interval, Chapter 8, 307-318; <i>Quiz 5 (covering materials from Oct. 5, 7 and 12)</i>
Wk. 10	10/26	Paired sample signed test, Chapter 8, 325-337
	10/28	Second Midterm (covering materials from Sept. 28 to Oct. 26)
Wk. 11	11/02	Categorical data, estimation of proportion, Chapter 355-365
	11/04	Categorical data, goodness-of-fit, Chapter 9, 368-382 <i>R-project 1 due.</i>
Wk. 12	11/09	Categorical data, relationships, Chapter 10, 383-401, 407-412
	11/11	Many Samples, ANOVA, Chapter 11, 442-454 <i>Quiz 6 (covering materials from Nov. 2 and 4)</i>
Wk. 13	11/16	Many samples, one and two-way ANOVA, Chapter 11, 455-465, 478-487
	11/18	Regression, correlation, Chapter 12, 511-524 <i>Quiz 7 (covering materials from Nov 9 and 11)</i>
Wk. 14	11/23	Regression, linear model, Chapter 12, 525-536
	11/25	Winter Recess.
Wk. 15	11/30	Regression, linear model guidelines, Chapter 12, 537-560
	12/02	Final Review <i>R-project 2 due.</i>

Final Exam: December 9, 4:30-6:30pm

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.