

BISC 305: Statistics for the Biological Sciences

Lectures: M and W, 6:00 PM – 7:20 PM, Online by Zoom meetings

Discussion: M or W, 1:00 – 1:50 PM, Online by Zoom meetings

Instructor: Cosimo Arnesano, arnesano@usc.edu, BRI 308E

Office hours: W, 2:00 – 4:00 PM, or by appointment

Teaching Assistant: Zifan Zhu, zifanzhu@usc.edu, RRI 416L

Office hours: M 2:00-4:00 PM, or by appointment

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), several short quizzes given during the course of the semester (10%), and a final examination (30%). 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 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.

Assignment	% of Grade
Homeworks	20
Quizzes	10
Project 1	5
Project 2	5
Midterm Exam 1	15
Midterm Exam 2	15
Final Exam	30
Total	100

USC Technology Support Links

[Zoom information for students](#)

[Blackboard help for students](#)

[Software available to USC Campus](#)

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 device 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.

Homework Assignments, Projects, Quizzes, Midterm and Final Exams

You can work in teams of 2 or 3 on the homeworks and projects. Only one member of the team will submit the assignment on Blackboard, making sure to report the names of all the team members. You are encouraged to discuss these assignments and brainstorm with your fellow teammate(s), TA and instructor. However, you should be able to do the whole assignment work by yourself in order to fully understand and be familiar with the concepts at stake. 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 based on individual work and 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 and submitted within 24 hours of the scheduled starting time of the quizzes and exams. If there are some evidences of violating USC scientific integrity rules, both the help providers and the recipients will receive zero credits for the relevant quizzes and exams.

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, but not required.

Zoom Invite:

We will meet and work together through USC Blackboard and Zoom.

Here are the details of the Zoom meeting login information for all the class, office hours, and discussion sessions:

Join Zoom Meeting

<https://usc.zoom.us/j/94223030791?pwd=ME50bXJPVE0wRC9NdE91VUVTZk9pUT09>

Meeting ID: 942 2303 0791

Passcode: BISC305g

One tap mobile

+16699006833,,94223030791# US (San Jose)

+13462487799,,94223030791# US (Houston)

Dial by your location

+1 669 900 6833 US (San Jose)

+1 346 248 7799 US (Houston)

+1 253 215 8782 US (Tacoma)

+1 646 876 9923 US (New York)

+1 301 715 8592 US (Germantown)

+1 312 626 6799 US (Chicago)

Meeting ID: 942 2303 0791

Find your local number: <https://usc.zoom.us/j/94223030791>

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 text book you have).

Week	Date	Topic	Reading	Deliverables
1	08/17	Introduction	Chapter 1, 1-26	
	08/19	Description of Samples and Populations	Chapter 2, 27-59	
2	08/24	Description of Samples and Populations	Chapter 2, 59-82	HW1
	08/26	Probability and the Binomial Distribution	Chapter 3, 83-93	
3	08/31	Probability and the Binomial Distribution	Chapter 3, 94-102	HW2
	09/02	Probability and the Binomial Distribution	Chapter 3, 102-115	
4	09/07	Labor Day (No lecture)		
	09/09	The Normal Distribution	Chapter 4, 122-140	HW3
5	09/14	Sampling Distribution	Chapter 5, 146-169	HW4
	09/16	Confidence Intervals	Chapter 6, 171-204	
6	09/21	Confidence Intervals	Chapter 6, 205-208, 211-222	HW5
	09/23	First Midterm		
7	09/28	Comparing of Two Independent Samples	Chapter 7, 223-248	HW6
	09/30	Comparing of Two Independent Samples	Chapter 7, 249-275	
8	10/05	The Wilcoxon-Mann-Whiney test	Chapter 7, 281-306	HW7
	10/07	Paired sample t-test and confidence interval	Chapter 8, 307-318	Project 1
9	10/12	Paired sample non-parametric tests	Chapter 8, 325-337	HW8
	10/14	Interpretation Categorical data, estimation of proportion	Chapter 8, 336-340 Chapter 9, 355-365	
10	10/19	Categorical data, goodness-of-fit	Chapter 9, 368-382	HW9
	10/21	Categorical data, relationships	Chapter 10, 383-401, 407-412	Project 2-a
11	10/26	Many Samples, one and two-way ANOVA	Chapter 11, 442-465, 478-487	HW10
	10/28	Second Midterm		
12	11/02	Regression, correlation	Chapter 12, 511-524	HW11
	11/04	Regression, linear model	Chapter 12, 525-536	Project 2-b
13	11/09	Regression, linear model guidelines	Chapter 12, 537-560	HW12
	11/11	Final Review	Chapter 1-12 review	

Final Exam: Wednesday, November 18, 7:00pm-9:00pm

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.