

Keck School of Medicine of USC
Department of Population and Public Health Sciences
PM 510: Principles of Biostatistics
Syllabus: Fall 2021

- Instructor:** Richard Watanabe, Ph.D.
E-mail: rwatanab@usc.edu
- Interactive Hours:** The 30 min period after end of class
Monday: 6-7 pm PDT via Zoom
<https://usc.zoom.us/j/98876848630?pwd=SnZZeVFieVhkM2hCaCtqWjBQN3J0dz09>
- Teaching Assistant (this section):** Shane Guglielmo
E-mail: sgugliel@usc.edu
By appointment
- Teaching Assistant (other section):** Felice Lin
E-mail: flin@usc.edu
By appointment
- Synchronous Session:** Wednesday: 1:30 – 3:20 pm
Location: MCH-156 (except 9/29 where we'll be in SSB-114)

Classroom Attendance: Unless students provide an accommodation letter from the Office of Student Accessibility Services documenting a disability or from the Office of International Services detailing visa or travel restrictions, attendance and active participation is expected in the classroom. Any student with such accommodations should submit their accommodation document to the instructor or TA as soon as possible to discuss appropriate accommodations.

Masks must be worn in class at all times. Students who refuse to wear a mask during class will be asked to do so. Refusal to wear a mask will result in you being asked to leave the classroom for the safety of everyone present.

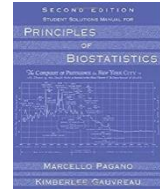
Per University guidelines, students must have an active and valid Trojan Check in order to attend class. Students who are experiencing illness should not attend class in person. Please follow University guidelines regarding self-quarantine if you suspect you might be infected with COVID-19 and get tested. Please inform the instructor in advance of any class sessions that you cannot attend for medical reasons and accommodations will be arranged to view recordings of any in-class lectures. Students will not be penalized for not attending class in person under these circumstances.

Course Objective: The objective of this course is to train students about the most commonly used statistical methods in clinical, public health, epidemiological, and experimental research.

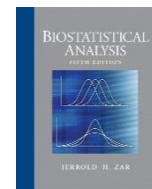
Students are expected to learn how to:

- 1) Select the most appropriate methods, apply these methods to actual data, and read and interpret computer output from a commonly used statistical package.
- 2) Read, critique, and interpret statistical concepts in the literature.
- 3) Write the statistical components of a scientific presentation (papers, grant applications, etc.).

Recommended Textbooks: *Principles of Biostatistics*, 2nd Edition
Marcello Pagano and Kimberlee Gauvreau
Duxbury, 2000



Biostatistical Analysis, 5th Edition
Jerrold H. Zar
Prentice Hall, Inc. (may be listed as Pearson
Prentice Hall or Pearson Education)



OpenIntro Statistics, 4th Edition
Diez DM, Barr CD, Cetinkaya-Rundel M.
<https://www.openintro.org/book/os/> (2019)



The electronic version of this text is free at the link above. You can purchase a hard copy on the above website or through Amazon for ~\$20. There are many supplemental materials with this text including videos and labs that you may find useful.

Software: IBM SPSS Statistics Premium 28. Some homework will require the use of SPSS, which is a statistical analysis software package. This software is offered for free through USC ITS. ITS has separately e-mailed you and provided a personalized link to download and install SPSS. Because the link is personalized, please do not share it with anyone else. However, if you did not receive an e-mail directly from ITS, to get SPSS you will need to go to <https://itservices.usc.edu/stats/spss/order> and do **TWO** things:

1. Request your subscription by following the instructions at the bottom of the order page
2. Download the software using the link provided by ITS.

SPSS is also freely available on the USC Virtual Desktop Interface (VDI; <https://itservices.usc.edu/vdi/>). However, if you have poor internet connectivity, we highly recommend you install a local copy of SPSS on your computer.

Other Materials: Recorded lectures and slides (posted on blackboard.usc.edu)
 Course reader (posted on BlackBoard)
 Homework assignments (posted on BlackBoard)
 Supplemental articles (posted on BlackBoard)
 On-line SPSS tutorial (Lynda.com)

Course Information: This course will employ a flipped classroom design to encourage active student participation and engagement with the course material. In order to facilitate optimal flipped classroom conditions that allow the most active student participation in discussion and learning in synchronous class sessions, students will be required to view videos and course materials posted in Blackboard or shared by your instructor in advance of class meetings. Students should come to class prepared to discuss course readings and any required viewing or supplementary materials. Please expect the following **weekly** time commitment for this course:

- Contact time (lectures/labs/discussion sections; pre-recorded or live): 3 hrs 55 min
- Out-of-class time (homework, readings): 9 hrs 15 min

Participation: Discussion will comprise a significant component of class participation. You are expected to respectfully and actively listen to your peers and to thoughtfully contribute your own ideas to our discussions.

What you will NOT need during synchronous sessions: Please turn off your cell phones or any other device that would disrupt the class.

Grading: Weekly Quizzes (15%)
 Midterm Exam (35%)
 Final Exam (40%)
 Homework Completion (10%)

Grading Scale			
A	95-100%	C	60-69.99%
A-	90-94.99%	C-	55-59.99%
B+	85-89.99%	D+	50-54.99%
B	80-84.99%	D	45-49.99%
B-	75-79.99%	D-	40-44.99%
C+	70-74.99%	F	<40%

Quizzes: There will be a weekly quiz given online ***before*** each synchronous session that covers that week's materials. The quizzes will be administered via Blackboard and you will have 15 min to take the quiz during the 36 hour period before the start of the synchronous session. That means you must take the quiz on your own during that 36 hour period prior to the start of each week's synchronous session. You will not be allowed to use any reference materials (your lecture notes, textbooks, internet-based resources) for the quizzes. The quiz is timed for 15 min, so please do not take more than 15 min. Because of the possibility of internet connectivity issues, we have set things up to be as flexible as possible. However, because of that Blackboard will allow you to exceed 15 min for the quiz. Please note Blackboard keeps track of your time, so it will indicate to us if you exceeded your time limit. If you exceed 15 min for the quiz, you will be penalized 1 point, so please keep track of your time. The quizzes are designed to help you determine if you are keeping up with the class materials and providing you feedback on where you might need to spend more time understanding specific materials. The questions on the quizzes will not reflect the types of questions that will be asked on the midterm or final exams.

Exams: There will be a midterm and a final. Both exams will be held during the synchronous class hours, but will be administered via Blackboard. You will only be allowed to use your lecture notes and the online p -value calculator for the exams. The exams are designed to test your ability to choose an appropriate statistical test to answer a specific research question, to test your knowledge of statistical concepts, and to test your ability to use a statistical test to obtain a correct conclusion to the research question. A reminder to fully charge your laptops prior to coming in for your exams.

Please turn off or silent your cell phones during the exam. You will not be allowed to touch your cell phones during the exam period. Also, you are on the honor system that you will not access additional materials online or on your computer during the exam.

Anyone found to have violated the honor system or reaching for their cell phones will receive an automatic grade of “F” for the exam.

Homework: Homework will be assigned after each topic is covered and will be due according to the schedule shown at the end of the syllabus. Homework will be available assigned and turned in using BlackBoard.

Late homework will not be accepted without an adequate excuse, *e.g.*, documented illness. Make arrangements with the instructor or TA *well in advance* of the deadline, if you know you will be late turning in a homework. Plan to complete all assignments early, in case unforeseen circumstances arise.

Rules for homework:

- Show all your work. All steps that led up to your answer must be shown.
- Write clearly. Sloppy/illegible work will receive no credit. It is highly recommended you use Word to write up your homework and cut-and-paste your SPSS output when necessary.
- For questions requiring an interpretation or conclusion, phrase these in your own words. If students are suspected of plagiarizing, *i.e.*, having the exact same wording of a free response answer, they will receive no credit for that problem **and will be subject to discipline.**
- Scan or take a picture of your written work, consolidate all your work into a single file for uploading to BlackBoard. File format can be PDF or Word document. Please make sure the scan/picture is clear!
- Again, *late homework will not be accepted.*
- There will be a section labeled “Beyond the Basics” for some of the homework assignments. These are extra problems for students who might be interested in a bit more theoretical detail underlying some of the topics we are covering in this course. These are not required as part of the assignment and are voluntary only.
 - If you are considering biostatistics as a future career, it is highly recommended you attempt the “Beyond the Basics” problems.

STATEMENT FOR STUDENTS WITH DISABILITIES

Any student requesting academic accommodations based on a disability is required to register with the Office of Student Accessibility Services (OSAS) each semester. A letter of verification for approved accommodations can be obtained from OSAS. Please be sure the letter is delivered to me (or to the TA) as early in the semester as possible. DSP is located in GFS-120 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. Website for [OSAS \(https://osas.usc.edu/\)](https://osas.usc.edu/) and contact information: (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) OSASFrontDesk@usc.edu.

STATEMENT ON ACADEMIC INTEGRITY

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. *SCampus*, the Student Guidebook, contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A.

EMERGENCY PREPAREDNESS/COURSE CONTINUITY IN A CRISIS

In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies. See the university's site on [Campus Safety and Emergency Preparedness](#).

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, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. engemannshc.usc.edu/counseling

National Suicide Prevention Lifeline – 1 (800) 273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class. equity.usc.edu

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.

Provides overall safety to USC community. dps.usc.edu

COURSE SCHEDULE*

Week	Date	Topics
1	8/25/21	Course logistics, data types, populations vs. samples, statistics vs. parameters, role of variables
2	9/1/21	Distributions, transformation of data to univariate normality, graphical representation of data
3	9/8/21	Descriptive statistics, Central Limit Theorem, Hypothesis testing, confidence intervals, p -values
9/10/21: Last day to drop class, receive a refund, and avoid a "W".		
4	9/15/21	Hypothesis testing, parametric 1-sample and 2-sample tests, sample size/power
5	9/22/21	Non-parametric 2-sample tests
6	9/29/21	Test of proportions (unpaired and paired), confidence intervals, sample size <i>Reminder we will meet in SSB-114</i>
7	10/6/21	MIDTERM
10/8/21: Last day to drop without a mark of "W" on transcript Last day to change Pass/No Pass to letter grade.		
8	10/13/21	Study designs
9	10/20/21	Goodness of fit, $r \times c$ contingency tables, Mantel-Haenszel <i>No class, recorded lecture</i>
10	10/27/21	Analysis of Variance
11	11/3/21	Analysis of Variance (Continued)
12	11/10/21	Regression and correlation analysis (parametric vs. non-parametric correlation coefficients, simple linear regression)
11/12/21: Last day to drop with a mark of "W"		
13	11/17/21	Logistic Regression, Survival Analysis
14	11/24/21: Thanksgiving Break	
15	12/1/21	Reproducing statistical results; What makes a well-written article?
12/3/21: Fall semester classes end		
12/15/21	FINAL EXAMINATION	

* Subject to change

Homework Assignments*			
Week	Date Assigned	Assignment	Due Date
1	8/25/21	HW 1	9/1/21
2	9/1/21	HW 2, HW 3	9/8/21
3	9/8/21	HW 4	9/15/21
4	9/15/21	HW 5	9/22/21
5	9/22/21	HW 6	9/29/21
6	9/29/21	HW 7 (no points)	
7	10/6/21	Midterm	
8	10/13/21	HW 8	10/20/21
9	10/20/21	HW 9	10/27/21
10	10/27/21	HW 10	11/3/21
11	11/3/21	HW 11	11/10/21
12	11/10/21	HW 12	11/17/21
13	11/17/21	HW 13	12/1/21
14	11/24/21	Thanksgiving Break	
15	12/1/21	No Assignment	
	12/15/21	FINAL EXAMINATION	

* **Schedule subject to change:** Homework problems will be assigned and posted on Blackboard each week. Some homework problems will require SPSS.