

**Bio 502: Biostatistics****Fall 2021**

Department of Biology, CSU Dominguez Hills

Class times & location:	Tu 5:30 – 8:15 pm (online) [REDACTED]
Instructor:	Dr. Sonal Singhal
Office hours:	MW 4 – 5p [REDACTED]
Office:	SCI 209 (but I'll never be there this semester!)
Phone:	[REDACTED]
E-mail:	<a href="mailto:ssinghal@csudh.edu">ssinghal@csudh.edu</a>

You need to submit proof of vaccination by Sept 30<sup>th</sup> at 5pm, or you will be dropped from any classes held on campus (F2F) classes. This class is NOT a F2F class.

**Course Description**

Statistics is how many scientists – including biologists – make sense of the data they collect about the world. In this class, you will learn the theoretical and practical applications and limitations of statistics. This course should help you understand which statistics you should use in your own research and should allow you to think more critically about the hundreds of statistics you see reported in the media and by the government yearly. *Prerequisite:* Math 131 (or equivalent)

**Student Learning Objectives**

After finishing this class, you should be able to:

- Use descriptive statistics to summarize of biological information
- Understand the power and importance of statistics for biological research
- Use descriptive statistics to summarize of biological information
- Interpret and evaluate common statistical tests
- Interpret and explain a p-value
- Understand the concepts of biological and statistical significance and uncertainty
- Be able to use computational tools to conduct statistical analyses
- Know how to choose the appropriate statistical test for the question at hand
- Communicate statistical results in written, tabular, and graphical formats
- Understand ways in which statistics can be misused

**Materials**

*Required Material:* None, but please have access to a computer or tablet. The school has some you can borrow for free! <https://techloaner.csudh.edu/>

*Recommended text:* Whitlock & Schluter, 2015. The Analysis of Biological Data, 2<sup>nd</sup> edition.

**Classroom Policies**

Online learning is hard. I get it. I will try to bring my best energy and be as organized as I can to help make it easier. On your end, come to class or participate on the online groups and turn on video (if you can!) when you come to class. While I do not require attendance, learning by yourself will be less fun and less effective, and it places a lot of burden on your peers.

Grading	
Problem sets:	36 points
Quizzes:	10 points
Class project:	25 points
Exams:	30 points
Total:	101 points

**Problem sets:** There will be nine (9) problem sets assigned over the course of the Fall 2021 term, each of which will be 5 – 10 questions long. You will be given time during class to start working on these problem sets. You are encouraged to complete problem sets in groups, though each person must turn in their own answers. Problem sets will be graded on accuracy and completion.

**Quizzes:** Most weeks, there will be a short 5 question multiple-choice quiz to take. The point of this quiz is for you (and me!) to evaluate how well you understand the material we have covered. You can take these quizzes multiple times, and your grade will be your score on your final attempt.

**Exams:** There will be two take-home exams, each of which will be 5 – 10 questions long. They will be very similar to the questions on the problem sets and will ask you to apply the information learned in class. You are encouraged to complete these in groups, but each person must turn in their own answers.

**Class project:** There will be a class project, in which you will apply the approaches discussed in class to either your own dataset or to a publicly available one of your interest. This project will be broken up into five deadlines (to help you avoid procrastination!), each of which will contribute to the overall grade.

- Choose Dataset: 2 pts
- Hypothesis Activity: 3 pts
- Statistical Analysis: 5 pts
- Final Project Written Report: 15 pts

Grades will be assigned on a standard scale:

A: 94 - 100	B+: 87 - 89	C+: 77 -79	D+: 67 - 69
A-: 90 - 93	B: 83 - 86	C: 73 - 76	D: 60 - 66
	B-: 80 - 82	C-: 70 - 72	F < 60

*Extra credit:* There will be no extra credit given in this class.

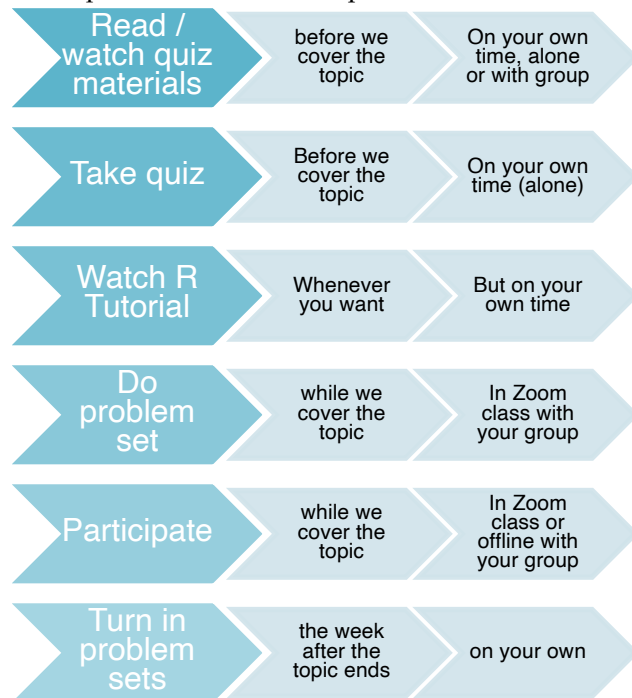
### Recommendations for Success

To be successful in class, I recommend:

- Doing the reading and/or finding an on-line equivalent of the textbook readings
- Attending online class regularly
- Working in a team of students (exchange info so you can to do problem sets together!)
- Asking questions in class either to me or your classmates
- Coming to office hours (earlier is better than later!)
- Applying what we learn in class to the problem sets, exams, and your own research data

### How Class Works

The course is set up around a series of topics, and the structure of each topic is the same.



### When stuff goes wrong

- If my Internet cuts out during Zoom class, wait for me to return for at least 5 minutes. If I don't come back, I will email you an update.
- If your Internet cuts out during class, I will miss you while you are gone, but I get it – it happens! Just come back to class if you can.
- If life gets complicated and you can't turn in an assignment in time, let me know. I am here to help you and there are things we can do to make sure you finish the class successfully and with less stress. These due dates are suggested due dates.

## Tentative Schedule

Week	Chapter	Topic	Assessment Due
24-Aug	1	Why statistics?	None
31-Aug	2	Describing data 1: graphs	Quiz 1 Problem Set 1
7-Sep	3	Describing data 2: means & variance	Quiz 2 Problem Set 2
14-Sep	4	Describing data 3: standard deviation	Quiz 3 Problem Set 3
21-Sep	6,14	Hypothesis Testing	Quiz 4 Problem Set 4
28-Sep	9, 10	Chi-square & contingency tests	Quiz 5 Problem Set 5
5-Oct		Exam 1	None
12-Oct	11, 12	T-tests	Quiz 6 Exam 1
19-Oct	15	ANOVAs	Quiz 7 Problem Set 6
26-Oct	16	Correlations	Quiz 8 Problem Set 7
2-Nov	17	Linear regression	Quiz 9 Problem Set 8
9-Nov	18	Multiple regression	Quiz 10 Problem Set 9 Project Dataset
16-Nov		Exam 2	Project Hypothesis
23-Nov		Preparation for projects	Exam 2
30-Nov		Preparation for projects	Project Statistical Analysis
7-Dec		Project Final Report Due	

### University Policies

*Academic Integrity:* This course will be conducted in accordance with the University Policy on Academic Integrity (p.14 University Catalog). Any student caught cheating or plagiarizing will receive an F (0 points) on the assignment and will be penalized according to University regulations. Cheating or plagiarism is subject to discipline as provided in Title 5, California Code of Regulations. Plagiarism is a very serious offense. See the University Catalog under Academic Integrity for further information.

*Exams:* no cellphone use of any kind is allowed during exams. Cellphones will be turned off and secured in your bookbag, which will be placed on the floor for the duration of the exam.

*Plagiarism:* it is imperative that you cite all your sources on assignments. Academic misconduct of any kind, including cheating on exams and plagiarism, will result in a grade of F for the course, and possibly other sanctions. Once you have completed this course, do not share assignments etc. with students in subsequent semesters. If anyone turns in your assignment in a future semester, you will be held accountable and face sanctions.

*Disruptive Students:* Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. The instructor may require a student responsible for disruptive behavior to leave class pending discussion and resolution of the problem and may report a disruptive student to the Student Affairs Office (WH A-410, 310-243-3784) for disciplinary action.

*CSUDH adheres to the Americans with Disabilities Act* with respect to providing reasonable accommodations for students with temporary and permanent disabilities. To receive accommodations, students with disabilities must register with Students disAbility Resource Center. For more information, please contact their office in Welch Hall D-180 at (310) 243-3660 (voice) or (310) 243-2028 (TDD).

*Computer/Information Literacy Expectations for Students enrolled in this class:* Students in this class are expected to:

- Use assigned Toromail account or other university approved email.
- Have ability to navigate and use Blackboard.
- Have basic information and computer literacy in one of the computer formats (Windows, Macintosh, or GNU/Linux).
- Upload files in all of the computer formats (.doc, .docx, .jpeg, .ppt, .pdg, .xps).
- Access and choose appropriate library and other scholarly sources of information.
- Search for and find relevant scholarly information effectively.
- Be able to paraphrase concepts without plagiarizing.
- Maintain the minimum computer Hardware requirements\*
- Maintain the minimum computer Software requirements\*

\*Please visit <http://www.csudh.edu/academic-technology/instructional-technologyresources/online-courses-tech/> for the most up-to-date Hardware & Software computer requirements