STAT 312: Statistical Methods for Engineers
Winter Quarter 2021

TIME/PLACE: Asynchronous. We will not have regularly scheduled class meetings via ZOOM or otherwise. Instead, course instruction is by regularly posted .pdf instructor guided notes, instructor guided videos, and assigned textbook readings from course instructor.

COURSE INSTRUCTOR: James Oksanish email: joksanis@calpoly.edu
OFFICE HOURS: To be conducted via ZOOM → https://calpoly.zoom.us/j/2042461173
2:00-3:00pm M-F, and by appointment
(To schedule office hours by appointment please email me.)

Note: When emailing any of your course instructors, it is advised that you use your Cal Poly email.

WEBSITE: Check Cal Poly Canvas site daily M-F through myportal.calpoly.edu

REQUIRED TEXT: *Applied Statistics for Engineers and Scientists* (3rd edition: Devore, Farnum, Doi)
Text is Available as a Hard Copy or Online (i.e., Digital Version) at:
https://www.bkstr.com/calpolystore/course-materials-results?shopBy=course&divisionDisplayName=&departmentDisplayName=STAT-Statistics&courseDisplayName=312&sectionDisplayName=75&programId=4561&termId=100066381

You only need to purchase EITHER the Hard Copy Text or the Online (i.e., Digital Version.)

COURSE NOTES: Daily (M-F) I will post my own notes in the Announcements section (as a .pdf) of Canvas to guide and summarize your assigned readings from the text.

ASSIGNMENTS: Daily (M-F) I will post a five-question multiple choice assignment in the Assignment tab (on the left side of canvas). There will be 41 of these throughout the quarter; you may drop your lowest assignment. For the assignments only (i.e., not Exams), you may work with other students in the course if you desire.

Each assignment will be due four days after it is assigned, and you may attempt up to a maximum of 3 times, though you do have unlimited time per attempt.

Each assignment will be weighted the same. As you are permitted to work with a partner (or me, via email or office hours), I am sorry, there is no partial credit on these. For assignments and (exams), you may use any calculator or computer software that you feel would be helpful to you. Ultimately, the assignments are meant to be a low stress and collaborative exercise in which you develop confidence with some of the more basic concepts of our course.

I am always available via email or regular office hours (or by appointment) for assistance with assignments.

VIDEOS: I will post a daily video(s) (of varying length) highlighting important points from that day's course notes and reading from the text, using practice problems as needed. (I won't be breaking new course ground, but just want to provide this resource for more visual/auditory learners.)

EXAMS: There will be 3 non-final Exams throughout the course, as well as a cumulative Final Exam (dates listed below).

The exams are multiple choice. Partial credit is awarded on Exams; however, you MUST email me your work immediately after you take the Exam to be eligible for such credit. (I'll broach this topic as we approach our first exam.)

All exams (including the final) will take place at 3pm PST, barring a previously documented excuse or documented student time conflict.

Should you have a time conflict, it is necessary for you to inform me in advance (as soon as possible) so that we can set an alternative time for you.

On each day of the course (M-F) that I post Course Notes as a .pdf, I will note in these specific examples and/or exercises in the textbook or otherwise having concepts that I feel you should know about our course for an exam; these are the types of problems you need to be able to solve for an exam.

GRADING:

Assignments	10%	Daily M-F
Exam 1	20%	Jan 20th
Exam 2	20%	Feb 10th
Exam 3	20%	Mar 4th
Final Exam	30%	Mar 17th

A [93.34, 100.00]	B [83.34, 86.66]	C [73.34, 76.66]	D [63.34, 66.66]
A- [90.00, 93.33]	B- [80.00, 83.33]	C- [70.00, 73.33]	D- [60.00, 63.33]
B+ [86.67, 89.99]	C+ [76.67,79.99]	D+ [66.67, 69.99]	F [00.00, 59.99]

COURSE SOFTWARE: No computer software is required for this course, and no prior computer programming knowledge is required for this course. Our textbook (wisely in my opinion) uses software output from many programs, including Minitab, SAS, R, and JMP, to illustrate that there are many different software options available to help us arrive at statistical solutions. The most difficult to use of these is R (or R Studio, the variant we may gain exposure to), but also has the highest upside; in addition to being free, more importantly it also has the ability to be used for the most applications. (As an aside, your course instructor used R Studio while employed as a Mathematical Statistician Fellow with the Division of Vector Borne Diseases with the Centers for Disease Control and Prevention (CDC) in Fort Collins, CO, and such output from that programming was used in multiple industry publications.)

Here, however, I believe we are justified in using MS Excel for our statistical calculations (or any other handheld calculator, or even pencil and paper) as it is perhaps the program/technique that we are most familiar with, and can be used as a check against any programming attempts in R Studio that we have, should we choose to partake. (But if you are not comfortable using the R Studio program, this program again is not required for our course.) I will announce any such programming options in Canvas.

COURSE CALENDAR: Our planned course calendar is otherwise below.

4-Jan	GRAPHICAL METHODS (CHAPTER 1.1)	8-Feb	REVIEW FOR EXAM 2
5-Jan	GRAPHICAL METHODS (CHAPTER 1.2)	9-Feb	REVIEW FOR EXAM 2
6-Jan	THE EXPONENTIAL DISTRIBUTION (CHAPTER 1.3)	10-Feb	**EXAM 2**
7-Jan	THE NORMAL DISTRIBUTION (CHAPTER 1.4)	11-Feb	POINT ESTIMATION; LARGE CI, POPULATION MEAN (CHAPTER 7.1 & 7.2)
8-Jan	THE WEIBULL DISTRIBUTION (CHAPTER 1.5)	12-Feb	MORE LARGE-SAMPLE CI's (CHAPTER 7.3)
11-Jan	THE BINOMIAL DISTRIBUTION (CHAPTER 1.6)	15-Feb	**WASHINGTON'S BIRTHDAY OBSERVED - HOLIDAY**
12-Jan	THE POISSON DISTRIBUTION (CHAPTER 1.6)	16-Feb	SMALL-SAMPLE INTERVALS, NORMAL POPULATION (CHAPTER 7.4)
13-Jan	THE HYPERGEOMETRIC DISTRIBUTION	17-Feb	CI INTERVAL FOR DIFFERENCE IN MEANS, (CHAPTER 7.5)
14-Jan	NUMERICAL SUMMARY MEASURES (CHAPTER 2.1 & 2.2)	18-Feb	CI INTERVAL FOR MEAN DIFFERENCE, NORMAL POP. (CHAPTER 7.5)
15-Jan	NUMERICAL SUMMARY MEASURES (CHAPTER 2.3)	19-Feb	HYPOTHESES AND TEST PROCEDURES (CHAPTER 8.1)
18-Jan	**MARTIN LUTHER KING, JR.'S BIRTHDAY OBSERVED - HOLIDAY**	22-Feb	HYPOTHESES AND TEST PROCEDURES (CHAPTER 8.1)
19-Jan	REVIEW FOR EXAM1	23-Feb	HYPOTHESIS TESTS ABOUT MEANS (CHAPTER 8.2)
20-Jan	**EXAM 1**	24-Feb	HYPOTHESIS TESTS ABOUT MEANS (CHAPTER 8.2)
21-Jan	SCATTER PLOTS & CORRELATION (CHAPTER 3.1 & 3.2)	25-Feb	CATEGORICAL POPULATIONS (CHAPTER 8.3)
22-Jan	CORRELATION (CHAPTER 3.2)	26-Feb	CATEGORICAL POPULATIONS (CHAPTER 8.3)
25-Jan	FITTING A LINE TO BIVARIATE DATA (CHAPTER 3.3)	1-Mar	REVIEW FOR EXAM 3
26-Jan	NONLINEAR RELATIONSHIPS (CHAPTER 3.4)	2-Mar	REVIEW FOR EXAM 3
27-Jan	MORE THAN ONE PREDICTOR (CHAPTER 3.5)	3-Mar	REVIEW FOR EXAM 3
28-Jan	OBTAINING DATA (CHAPTER 4)	4-Mar	**EXAM 3**
29-Jan	CHANCE EXPERIMENTS & PROBABILITY CONCEPTS (CHAPTER 5.1 & 5.2)	5-Mar	ANOVA, TERMINOLOGY AND CONCEPTS (CHAPTER 9.1)
1-Feb	CONDITIONAL PROBABILITY AND INDEPENDENCE (CHAPTER 5.3)	8-Mar	SINGLE-FACTOR ANOVA (CHAPTER 9.2)
2-Feb	RANDOM VARIABLES (CHAPTER 5.4)	9-Mar	INTERPRETING ANOVA RESULTS (CHAPTER 9.3)
3-Feb	SAMPLING DISTRIBUTIONS (CHAPTER 5.5)	10-Mar	RANDOMIZED BLOCK EXPERIMENTS (CHAPTER 9.4)
4-Feb	DESCRIBING SAMPLING DISTRIBUTIONS (CHAPTER 5.6)	11-Mar	EXPERMENTIAL DESIGN, FACTORIAL (CHAPTER 10)
5-Feb	DESCRIBING SAMPLING DISTRIBUTIONS (CHAPTER 5.6)	12-Mar	X-bar - R Charts, p charts, c charts (CHAPTER 6); LAST DAY OF CLASS

A PRACTICE FINAL EXAM (optional) will be distributed on the last day of class (Fri. Mar. 12th) and our Final Exam is scheduled for Wed. Mar. 17th at 3:00PM. (Please let me know at least two weeks before the final exam if you have a time conflict.)

HOW TO SUCCEED IN THIS COURSE:

On a daily basis (M-F), begin by looking at our course notes for that day (found in the Announcements tab as a .pdf file). These course notes will guide you through what you need to know from the assigned reading from the textbook for that day; at times in my notes, I deliberately leave sections 'blank' for you to fill out by hand to practice that given formula, example or exercise. (Any such example or exercise from the textbook I cite from the notes is fair game for an exam.)

Next, attempt to take that day's Assignment.
Finally, take a look at the video (even if you scored perfect on the Assignment).

Let me say again:
You are always welcome to ask questions by email or attending virtual regular office hours (or scheduling office hours by appointment, via email).

Ultimately, you want to be comfortable with any referenced examples or exercises that I cite in the daily .pdf course notes!

Finally, please take note of the **Cal Poly student responsibilities, policies, and programs** below that all apply to of our course, and please contact me in reference to any of these as needed. Ultimately, these policies and procedures are guidance for the umbrella topic of "HOW TO SUCCEED IN THIS COURSE." Good luck in this course, and I look forward to assisting in your academic progress this quarter.

Sincerely,

James Oksanish

Student Care Resources (include basic needs and others)

If you face challenges securing food, housing or other basic needs, you are not alone, and Cal Poly can help during this time of crisis. We invite you to learn about the many resources available to support you through Cal Poly's Basic Needs initiative at basicneeds.calpoly.edu or by contacting deanofstudents@calpoly.edu. An extensive list of critical care resources is also listed and updated on the Cal Poly Coronavirus information pages Student Care Resources page.

If you have specific questions about the services available to you through Cal Poly during the coronavirus outbreak, please visit the Cal Poly Coronavirus website. For specific information on frequently asked questions about Cal Poly classes and programs, visit the Classes and Programs section of this website. If you have concerns about accessing the tools that you need to continue with your studies, including technology, please contact retention@calpoly.edu.

If I can help you in any way to access the resources above, or if you have any questions about student care resources, please contact me so that I can assist you. I am committed to ensuring that all students have the resources they need to be able to participate in this course.

Cal Poly's Disability Resource Center

It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Disability Resource Center, Building 124, Room 119, at (805) 756-1395, as early as possible in the term.

Mental Well-Being

American College Health Surveys of university students consistently find that stress, sleep problems, anxiety, depression, interpersonal concerns, death of a significant other, and alcohol use are among the top ten health impediments to academic performance. Students experiencing personal problems or situational crises during the quarter are encouraged to contact Counseling Services (805-756-2511) for assistance, support and advocacy. This service is free and confidential.

Inclusion and Classroom Climate (Sample Language Adapted from CLA)

I strive to make this classroom a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, social classes, genders, gender identities, gender expressions, national origins, documentation statuses, religious affiliations, sexual orientations, abilities – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful and inclusive environment for every other member of the class. This does not mean we cannot disagree or have different ideas. It does mean we try to consider perspectives other than our own, though they may differ from our own beliefs/experiences. If you experience disrespect or discrimination in this class, please report your experiences to me.

Additionally, it is important to know that the COVID-19 pandemic has led to an increase in racist and xenophobic actions and sentiments worldwide and locally that are anti-Asian, anti-Asian American, and anti-Chinese. Racist, xenophobic, and other oppressive comments are harmful, regardless of intent. In this course, I ask all students to be mindful of their comments and to be aware that although they may not intend to hurt others, some comments have a harmful impact.

Statement on Pronouns and Preferred Names

At Cal Poly everyone has the right to be addressed by the name and personal pronouns that correspond to their gender identity, including non-binary pronouns, for example: they/them/theirs, ze/zir/zirs, etc. As of January 2020, students can update their pronouns in their Canvas user settings. If you have not yet updated your pronouns in Canvas, you can do so at the beginning of the term so that I can make sure to refer to you using the correct pronouns. If your pronoun set is not available in Canvas, please let me know. I recognize that preferred names and pronouns may change during the quarter, if

at any point during the quarter you would like to be addressed differently, please let me know.

As part of our commitment to inclusion in this course, it is important that all students in this class respect the preferred names and pronouns of their peers. Mistakes in addressing one another may happen. If you make a mistake or are corrected, please briefly apologize and correct yourself. To learn more about personal pronouns and why they are important please visit Cal Poly's Pronouns Matter website and mypronouns.org.

Academic Integrity

Cal Poly is dedicated to nurturing an inclusive and academically excellent community, which can only flourish with honesty, trust, and mutual respect. At the core of academic excellence is the search for knowledge through the open and dynamic exchange of ideas. You and your student peers must have a strong commitment to personal and professional integrity that informs your behavior both before and after graduation, discouraging you from creating a false appearance of achievement by presenting the work of others as your own, or bending or breaking the rules of any situation. Either action can lead to serious consequences, academic and otherwise. Please thoroughly familiarize yourself with the Office of Students' Rights and Responsibilities page on Academic Integrity, as well as the information found on Academic Programs and Planning website regarding cheating and plagiarism.

Course Materials and Intellectual Property (CLA Sample Language)

Please note that all course materials, provided by the instructor and/or other sources, are covered by copyright protections. Students are not authorized to record, share, repost, and/or redistribute these materials in any form(s) (such as, but not limited to, hard copy and electronic forms) in any venue(s) (such as, but not limited to, social media platforms and online study material sites). In some cases, sharing, re-posting, recording, and/or redistributing course materials constitutes a violation of Cal Poly academic integrity policies, while in other cases such actions constitute a violation of copyright protections. In all cases, such actions shall have serious consequences.