Point Loma Nazarene University, Fall 2024

Calculus Based Statistics with R

Department of Mathematical, Information and Computer Science – School of STEM

Instructor: Kyle Havens	**Course:** Math 3063	**Section:** 1	**Units:** 3
Office: Rohr Science 210	**Classroom:** RS 395	**Time:** 11:00am – 11:55am	
Email: kylehavens@pointloma.edu	**Days:** Mon, Wed, and Fri	**Dates:** September 3rd - December 16th	

PLNU Mission – Teach, Shape, Send: Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Department Mission: The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

Course Description: A first course in descriptive and inferential statistics for general students who have taken calculus. Topics include experimental design, sampling and sampling distributions, estimation, and hypothesis testing. This course also provides a basic introduction to statistical analysis in the statistical software package R. Not applicable toward a major in mathematics.

Required Materials:

1. Baldi and Moore. *The Practice of Statistics in the Life Sciences*, 4th edition. ISBN: 9781319013530.
2. Graphing Calculator (TI-84+ recommended, TI-83+ adequate).
3. Use of a computer with internet for Canvas and R.

Office Hours: My office is in Rohr Science room 210. I have open office hours at the following times:
Monday and Wednesday: 1:00 pm – 2:15 pm, Tuesday and Thursday: 7:30 am – 10:00 am, Friday: 8:45 am – 9:45 am.

Student Learning Outcomes: Upon completion of this course, students will be able to:

1. Compute measures of central tendency for data.
2. Compute measures of dispersion for data.
3. Use statistical methods to make inferences from data.
4. Apply their technical knowledge to solve problems.

Class Performance: Your final grade in my class will be calculated with the following weighting system.

25%	Final Exam	Cumulative. You must get a "D" on the final exam to pass.
35%	Exam Average	The average score of your two in-class exams.
10%	Labs	Use R to statistically analyze large data sets.
5%	Lab Final	A short in-person lab final using R.
17%	Written Homework	Traditional written homework from the textbook.
8%	Class Activities	Based on participation in group activities and attendance.

Final Exam: The final exam is cumulative, is not curved, and will be held at the following time:

Monday, December 16th from 10:30am to 1:00pm.

Letter Grade: The letter grade you receive is based on the previously described weighted grading system.

[92%,100%]: A	[82%,88%): B	[70%,78%): C
[90%,92%): A-	[80%,82%): B-	[68%,70%): C-
[88%,90%): B+	[78%,80%): C+	[60%,68%): D

The grade you receive at the end of the semester will be the grade you earned based on the grading system. All requests for an opportunity to improve your grade due to personal circumstances will be denied. Borderline grades may be rounded up if student has good attendance.

Final Exam: Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the Traditional Undergraduate Records: Final Exam Schedules site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

Written Homework: The written homework is chosen to help challenge you to grasp the concept of statistics. Written homework will always be posted on Canvas and will be submitted online in Canvas. The problems are to be done by hand and are assigned from your textbook. The due dates will be posted in Canvas, but typically you will have around one week to complete the assignments from a chapter after it is covered in class. Each problem will be graded for both completeness correctness via random sampling by a student grader. Late homework is not accepted without a well-documented emergency. Please be sure that written assignments are legible and organized. You are responsible for ensuring your submissions can be viewed by the grader. If your submission is illegible or causes an error you will be marked late or missing. I encourage you to work together on your homework, but directly copying another student's homework is considered plagiarism and will not be tolerated. A maximum of one homework assignment will be accepted late with a 10% penalty. Contact Professor Havens before missing an assignment due to emergencies.

Exams: There will be a total of two mid-semester exams roughly every six weeks of the semester. One 8.5"x11" page of notes will be allowed on each exam. Graphing calculators are allowed on the exam. No make-up exams are allowed without prior consent. Contact me **before** missing an exam if you have a critical emergency. If you do not inform me that you will be missing an exam beforehand, you will get a zero on that exam. Exams are weighted equally at 17.5% of your total grade. If you have good attendance throughout the semester (no more than one unexcused absence), I will adjust the weighted scale of the exams in your favor, 22.5% for the highest exam and 12.5% for the lowest. Practice exam questions will be posted on Canvas in advance of the exam designed to help you identify topics that you need to study.

Class Activities and Participation: Mathematics requires active participation. Participation means: asking questions, taking notes, making conjectures and checking them, providing solutions to problems, and sharing ideas with classmates. During class time we collectively will participate in the same way. I will act as the expert facilitator during class time, with a mixture of lecture, group problem solving, and integrated discussion. You will receive points for each class attended by using the sign-in sheet. Each class we will work on a class activity directly related to the chapters of study. You are to work on them in your groups and submit them to Canvas by the last day of lecture on the subject. These may be fully graded or you may get credit for completion, depending on the activity.

Labs/Lab Final: The labs are due at the scheduled dates and times, and must be submitted using either Word or PDF format in Canvas. Labs are **individual assignments**. Collaboration between students is encouraged but copying the lab reports of others is not tolerated. You should be using your own words, your own R application, and your own screenshots, even if you are working together. If you submit the same workbooks or have the same write-ups as another student you will get a zero and may face repercussions with academic affairs. Up to one lab assignment will be accepted late with a 10% penalty. Contact Professor Havens before missing an assignment due to emergencies. The lab final will occur the last week of class and will be short test of your R skills. You must bring your computer to the lab final.

Class Enrollment: It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

Course Credit Hour Information: In the interest of providing sufficient time to accomplish the stated Course Learning Outcomes, this class meets the PLNU credit hour policy for a 3-unit class delivered over 15 weeks. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework. For this course, students will spend an 115 estimated total hours meeting the course learning outcomes. The time estimations are provided in the Canvas modules. Specific details about how the class meets the credit hour is provided below.

PLNU Attendance Policy: Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university withdrawal date or, after that date, receive an "F" grade.

- Online Courses: These are courses with class meetings where all instruction and interaction is fully online.
- Synchronous Courses: At least one class meeting takes place at a designated time.
- Asynchronous Courses: All class meetings are asynchronous.
- Hybrid Courses: These are courses with class meetings that take place both in the classroom and online synchronously and/or asynchronously.
- In-Person Courses: These are courses that meet in person with the instructor and students in a physical classroom setting. With approval by the area dean, this may include up to 25% of qualified class interactions through a Learning Management System (such as Canvas).

In some courses, a portion of the credit hour content will be delivered asynchronously and attendance will be determined by submitting the assignments by the posted due dates. See Academic Policies in the Undergraduate Academic Catalog.

Content Warning: I acknowledge that each of you comes to PLNU with your own unique life experiences. This contributes to the way you perceive various types of information. In statistics, all of the class content, including that which may be intellectually or emotionally challenging, has been intentionally curated to achieve the learning goals for this course. The decision to include such material is not taken lightly. These topics include experimental design, analysis of trends, inference, and multiple comparisons. If you encounter a topic that is intellectually challenging for you, it can manifest in feelings of discomfort and upset. In response, I encourage you to come talk to me or your friends or family about it. Class topics are discussed for the sole purpose of expanding your intellectual engagement in the area of mathematics, and I will support you throughout your learning in this course.

Trigger Warning: I acknowledge that each of you comes to PLNU with your own unique life experiences. This contributes to the way you perceive several types of information. In statistics, we will cover a variety of topics, some of which you may find triggering. These topics include experimental design, analysis of trends, inference, and multiple comparisons. Each time this topic appears in a reading or unit, it is marked on the syllabus. The experience of being triggered versus intellectually challenged are different. The main difference is that an individual must have experienced trauma to experience being triggered, whereas an intellectual challenge has nothing to do with trauma. If you are a trauma survivor and encounter a topic in this class that is triggering for you, you may feel overwhelmed or panicked and find it difficult to concentrate. In response, I encourage you to take the necessary steps for your emotional safety. This may include leaving class while the topic is discussed or talking to a therapist at the Counseling Center. Should you choose to sit out on discussion of a certain topic, know that you are still responsible for the material; but we can discuss if there are other methods for accessing that material, and for assessing your learning on that material. Class topics are discussed for the sole purpose of expanding your intellectual engagement in the area of mathematics, and I will support you throughout your learning in this course.

Spiritual Care: Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith. If students have questions, a desire to meet with the chaplain or have prayer requests you can contact the Office of Spiritual Development.

State Authorization: State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on State Authorization to view which states allow online (distance education) outside of California.

PLNU Academic Honesty Policy: Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. For all student appeals, faculty and students should follow the procedures outlined in the University Catalog. See Academic Policies for definitions of kinds of academic dishonesty and for further policy information.

Academic Accommodations: PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities in accordance with the Americans with Disabilities Act (ADA). Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will work with the student to create an Accommodation Plan (AP) that outlines allowed accommodations. The EAC makes accommodations available to professors at the student's request.
PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course. Accommodations are not retroactive so clarifying with the professor at the outset is one of the best ways to promote positive academic outcomes. Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC. Students cannot assume that because they had accommodations in the past, their eligibility at PLNU is automatic. All determinations at PLNU must go through the EAC process. This is to protect the privacy of students with disabilities who may not want to disclose this information and are not asking for any special accommodations.

Use of "Artificial Intelligence:" You are allowed to use Artificial Intelligence (AI) tools (e.g. ChatGPT, Gemini Pro 1.5, GrammarlyGo, Perplexity, etc.) to generate ideas, but you are not allowed to use AI tools to generate content (text, video, audio, images) that will end up in any work submitted to be graded for this course. If you have any doubts about using AI, please gain permission from the instructor.

PLNU Recording Notification: In order to enhance the learning experience, please be advised that this course may be recorded by the professor for educational purposes, and access to these recordings will be limited to enrolled students and authorized personnel. Note that all recordings are subject to copyright protection. Any unauthorized distribution or publication of these recordings without written approval from the University (refer to the Dean) is strictly prohibited.

Language of Belonging: Point Loma Nazarene University faculty are committed to helping create a safe and hospitable learning environment for all students. As Christian scholars we are keenly aware of the power of language and believe in treating others with dignity. As such, it is important that our language be equitable, inclusive, and prejudice free. Inclusive/Bias-free language is the standard outlined by all major academic style guides, including MLA, APA, and Chicago, and it is the expected norm in university-level work. Good writing and speaking do not use unsubstantiated or irrelevant generalizations about personal qualities such as age, disability, economic class, ethnicity, marital status, parentage, political or religious beliefs, race, gender, sex, or sexual orientation. Inclusive language also avoids using stereotypes or terminology that demeans persons or groups based on age, disability, class, ethnicity, gender, race, language, or national origin. Respectful use of language is particularly important when referring to those outside of the religious and lifestyle commitments of those in the PLNU community. By working toward precision and clarity of language, we mark ourselves as serious and respectful scholars, and we model the Christ-like quality of hospitality.
If you (or someone you know) have experienced a bias incident regarding language, you can find more information on reporting and resources at www.pointloma.edu/bias.

Sexual Misconduct and Discrimination: In support of a safe learning environment, if you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that accommodations and resources are available through the Title IX Office at pointloma.edu/Title-IX. Please be aware that under Title IX of the Education Amendments of 1972, faculty and staff are required to disclose information about such misconduct to the Title IX Office. If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at counselingservices@pointloma.edu or find a list of campus pastors at pointloma.edu/title-ix. If you (or someone you know) have experienced other forms of discrimination or bias, you can find more information on reporting and resources at www.pointloma.edu/bias.

Class Schedule: This course syllabus and schedule are subject to change due to unforeseen circumstances.

Week of	Monday	Wednesday	Friday
9/2/2024	*NO CLASS* *Labor Day*	Course Intro and Ch.1 *Begin Class Activity Ch1-2*	Ch1-2: Picturing Distributions *Continue Class Activity Ch1-2*
9/9/2024	Ch1-2: Lab Day *Work on Lab 1*	Ch2: Describing Distributions *Finish Class Activity Ch1-2*	Ch3: Scatterplots and R^2 *Begin Class Activity Ch3-5*
9/16/2024	Ch2: Lab Day *Work on Lab 2*	Ch4: Regression *Continue Class Activity Ch3-5*	*NO CLASS* *Professor Out Of Town*
9/23/2024	Ch3-4: Regression *Work on Lab 3*	Ch5: Two-Way Tables *Finish Class Activity Ch3-5*	Ch6-7: Samples and Studies *Begin Class Activity Ch6-8*
9/30/2024	Ch7-8: Designing Experiments *Finish Class Activity Ch6-8*	Ch9: Essential Probability *Begin Class Activity Ch9-10*	Ch10: More Probabilities *Finish Class Activity Ch9-10*
10/7/2024	Ch11: Normal Distribution *Begin Class Activity Ch11*	Ch11: Normal Distribution *Finish Class Activity Ch11*	Ch1-11: Recap and Catch Up *Review for Exam*
10/14/2024	***Exam #1***	Ch12: Binomial Distribution *Begin Class Activity Ch12-13*	Ch13: Sampling Distribution *Finish Class Activity Ch12-13*
10/21/2024	Ch13: Lab Day *Work on Lab 4*	Ch14: Inference Intro *Begin Class Activity Ch14-15*	*NO CLASS* *Fall Break*
10/28/2024	Ch14-15: Inference in Practice *Continue Class Activity Ch14-15*	Ch15: Confidence Intervals *Continue Class Activity Ch14-15*	Ch15: Tests of Significance *Finish Class Activity Ch14-15*
11/4/2024	Ch14-15: Lab Day *Work on Lab 5*	Ch17: T-Procedures *Begin Class Activity Ch17-18*	Ch17: T-Procedures *Continue Class Activity Ch17-18*
11/11/2024	Ch18: Comparing Two Means *Continue Class Activity Ch17-18*	Ch18: Comparing Two Means *Finish Class Activity Ch17-18*	Ch17-18: Lab Day *Work on Lab 6*
11/18/2024	***Exam #2***	Ch19: Proportions *Begin Class Activity Ch19-20*	Ch19: Comparing Proportions *Finish Class Activity Ch19-20*
11/25/2024	Ch19-20: Lab Day *Work on Lab 7*	*NO CLASS* *Thanksgiving Break*	
12/2/2024	Ch22,24: ANOVA, Chi-Square *Begin Class Activity Ch22,24*	Ch22,24: ANOVA, Chi-Square *Finish Class Activity Ch22,24*	Ch 22,24: Lab Day *Work on Lab 8*
12/9/2024	***Lab Final***	Review and Recap *Finish Activity and Lab*	*OPTIONAL* *Office Hours*
12/16/2024	***Final Exam*** Monday 12/16 @ 10:30-1pm	*NO CLASS* *Finals Week*	