


Syllabus

 POINT LOMA NAZARENE UNIVERSITY	Department of Mathematics, Information and Computer Sciences MTH3083 Mathematical Probability and Statistics (3 Units)
Spring 2024 January 8 th - May 3 rd	

Meetings	Final Exam	Instructor:	Email:	Phone:	Office Hours:
TR 2:30-3:45 RS 395	4:30-7:00 pm Thursday May 2 nd , 2024	Greg Crow, Ph.D.	gcrow@pointloma.edu	619.849.2604	Posted in Canvas

PLNU Mission

To Teach ~ To Shape ~ To 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 probability and statistics for students with sophisticated mathematics exposure. Topics include axioms of probability, random variables, discrete and continuous distributions, mathematical expectation, limit theorems, least square estimates of parameter, linear regression, experimental design, hypothesis testing, and confidence of intervals, testing of models, data analysis and appropriateness of models. Topics are supported by the use of statistical software.

Prerequisite: Mathematics 2074 or equivalent

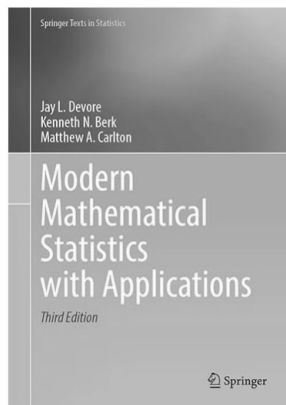
COURSE LEARNING OUTCOMES

- Students will be able to apply their mathematical knowledge to solve problems.
- Students will be able to use technology to solve problems.
- Students will collaborate effectively in teams.
- Students will be able to understand and create arguments supported by quantitative evidence, and they can clearly communicate those arguments in a variety of formats.

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

Modern Mathematical Statistics with Applications, 3rd ed. by Jay L. Devore and Kenneth N. Berk





ASSESSMENT AND GRADING

Graded Components

- **Weekly Classwork:** Attendance at each class is required. In these class meetings, we will work have lectures, work on activities and problems. Some classwork may be graded, and some you will get full credit just for attempting.
- **Written Homework:** The homework is designed to allow you to grasp the concepts of Statistics; it is not an end in itself. The homework problems will be taken from the Textbook and hand written on paper. There may also be other activities that are completed as homework. Each homework set will be due on Friday of the week after it is assigned. Please see the schedule below. Late homework will not be accepted without prior consent or a well-documented emergency beyond your control. Up to a maximum of one homework assignment will be accepted up to 3 days late provided that consent is received from the professor before it is due. Written homework that is submitted late without prior consent will be recorded with a score of zero. The lowest homework score will be dropped prior to computing the final course grade.

In the event that our in person class is prohibited from meeting in person in a given week, please scan or photograph the pages, and upload the file to Canvas as a .pdf, .jpg, .jpeg, .png, or .docx (but not Google Docs). If you take a photograph with your phone, then please turn off the setting for *Live Photos* or *Motion Photo* prior to taking the picture. If you use Google Docs, please export to a .pdf and upload that file.

- **Labs** - The labs will be posted in Canvas and are due in Canvas at the scheduled times (by 11:59 pm on Saturday). Up to a maximum of one Lab assignment will be accepted up to 3 days late provided that consent is received from the professor before due. Lab assignments that are submitted late without prior consent will be recorded with a score of zero.



- **Examinations and the Final Examination** - There will be two Mid-Semester Examinations and a comprehensive Final Examination. Both Mid-Semester Examinations and the Final Examination will include problems and questions over material assigned in the text, readings and handouts, as well as material presented in class. The examination schedule is included in the daily schedule. The instructor will not accept excuses such as poor communication with parents, benefactors, surf team sponsors and/or travel agents. No examination shall be missed without prior consent or a well-documented emergency beyond your control. In such cases, all make-up exams will occur at 8:30 am on the Saturday between classes and Final Exam week. A score of zero will be assigned for an examination that is missed without prior consent or a well-documented emergency beyond your control.

Final Exam: Scheduled on Thursday May 2nd, 2024 **from** 4:30-7:00 pm in the classroom. Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the **Class Schedules** (<http://www.pointloma.edu/experience/academics/class-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.

Grading Distribution	Percent
Homework	25
Labs	10
Two Examinations at 15% each	30
Final Exam	35
Total	100

Grading Scale



Grades are based on the number of points accumulated throughout the course with the following exception. A student must pass at least one of Examination 1, Examination 2, or the Final Examination in order to pass the class. That is, a score of 60% must be achieved on one of Examination 1, Examination 2, or the Final Exam or else the final grade will be an F regardless of all other point totals. Approximate minimal percentages required to obtain a given grade are

Standard Grade Scale Based on Percentages					
	A	B	C	D	F
+		[87.5-90.0)	[77.5-80.0)	[67.5-70.0)	
	[92.5-100]	[82.5-87.5)	[72.5-77.5)	[62.5-67.5)	[0.0-60.0)
-	[90.0-92.5)	[80.0-82.5)	[70.0-72.5)	[60.0-62.5)	

INCOMPLETES AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. We understand that life happens, if you contact your instructor prior to the due date of the assignment you may request one extension as indicated above. Incompletes will only be assigned in extremely unusual circumstances.

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.



PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.


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. Faculty should follow and students may appeal using the procedure in the university Catalog. See [Academic Policies](#) (<http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278>) for definitions of kinds of academic dishonesty and for further policy information.

ARTIFICIAL INTELLIGENCE (AI) POLICY

You are allowed to use Artificial Intelligence (AI) tools (e.g, ChatGPT, iA Writer, Marmot, Botowski) 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 ACADEMIC ACCOMMODATIONS POLICY

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu  <https://mail.google.com/mail/?view=cm&fs=1&tf=1&to=EAC@pointloma.edu>) or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

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 and/or if they do not wish to utilize some or all of the elements of their AP in that course.

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.



EAC.

SEXUAL MISCONDUCT AND DISCRIMINATION POLICY

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 (<http://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 <https://mail.google.com/mail/?view=cm&fs=1&tf=1&to=counselingservices@pointloma.edu> or find a list of campus pastors at pointloma.edu/title-ix (<http://pointloma.edu/title-ix>).

PLNU ATTENDANCE AND PARTICIPATION POLICY

Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in 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 the appropriate grade for their work and participation. See [Academic Policies](http://catalog.pointloma.edu/content.php?catid=18&navoid=1278) (<http://catalog.pointloma.edu/content.php?catid=18&navoid=1278>) for further information about class attendance.

COURSE MODALITY DEFINITIONS:

1. **In-Person:** Course meetings are face-to-face with no more than 25% online delivery.
2. **Online:** Coursework is completed 100% online and asynchronously.
3. **Online Synchronous:** Coursework is completed 100% online with required weekly online class meetings.
4. **Hybrid:** Courses that meet face-to-face with required online components.

USE OF TECHNOLOGY:

In order to be successful in the online or hybrid environment, you'll need to meet the minimum technology and system requirements please refer to the [Technology and System Requirements](https://help.pointloma.edu/TDCClient/1808/Portal/KB/ArticleDet?ID=10) (<https://help.pointloma.edu/TDCClient/1808/Portal/KB/ArticleDet?ID=10>)



information. Additionally, students are required to have headphone speakers, microphone, or webcams compatible with their computer available to use. Please note that any course with online proctored exams requires a computer with a camera (tablets are not compatible) to complete exams online.

Problems with technology do not relieve you of the responsibility of participating, turning in your assignments, or completing your class work.

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** (<https://www.pointloma.edu/offices/office-institutional-effectiveness-research/disclosures>) to view which states allow online (distance education) outside of California.

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 Student Life and Formation** (<https://www.pointloma.edu/offices/spiritual-development>).



	Sun	Mon	Tues	Wed	Thursday	Fri	Sat	
January	7	8	9 Course Introduction 1.1: The Language of Statistics 1.2: Graphical Methods in Descriptive Statistics 1.3: Measures of Center 1.4: Measures of Variability	10	11 2.1: Sample Spaces and Events 2.2: Axioms, Interpretations and Properties of Probability 2.3: Counting Methods 2.4: Conditional Probability	12	13	
	14	15 MLK Day	16 2.5: Independence 3.1: Random Variables 3.2: Probability Distributions for Discrete Random Variables	17	18 3.3: Expected Values of Discrete Random Variables 3.4: Moments and Moment Generating Functions 3.5: The Binomial Probability Distributions	19	20 Due: Lab 1	
	21	22	23 3.6: The Poisson Probability Distribution 3.7: Other Discrete Distributions 3.8: Simulation of Discrete Random Variables	24	25 4.1: Probability Density Functions and Cumulative Distribution Functions 4.2: Expected Values and Moment Generating Functions	26	27	
	28	29	30 4.3: The Normal Distribution 4.4: The Gamma Distributions and Its Relatives Spiritual	31	1 4.6: Probability Plots 4.7: Transformations of a Random Variable 4.8: Simulation of Continuous Random Variables Renewal	2 Week	3 Due: Lab 2	
February	4	5	6 Catch up and Review for Exam I	7	8 Exam I	9	10	
	11	12	13 5.1: Jointly Distributed Random Variables 5.2: Expected Values, Covariance, and Correlation 5.3: Linear Combinations	14	15 5.4: Conditional Distributions and Conditional Expectation 5.5: The Bivariate Normal Distribution 5.6: Transformations of a Random Variable	16	17 Due: Lab 3	
	18	19	20 5.7: Order Statistics 6.1: Statistics and Their Distributions	21	22 6.2: The Distribution of the Sample Totals, Means, and Proportions 6.3: The (χ^2), t , and F Distributions	23	24	
	25	26	27 6.4: Distributions Based on a Normal Random Sample 7.1: Concepts and Criteria for Point Estimation	28	29 7.2: The Methods of Moments and Maximum Likelihood	1	2 Due: Lab 4	
March	3	4 Spring	5 _____	6 Break	7 _____	8 Week	9	
	10	11	12 7.3 Sufficiency 7.4 Information and Efficiency (AIC)	13	14 8.1: Basic Properties of Confidence Intervals 8.2: The One-Sample t interval and Its Relatives 8.3: Intervals for a Population Proportion	15	16	
	17	18	19 8.4 Confidence Intervals for the Population Variance and Standard Deviation 8.5: Bootstrap Confidence Intervals	20	21 9.1: Hypotheses and Test Procedures 9.2: Tests About a Population Mean	22	23 Due: Lab 5	
	24	25	26 9.3: Tests About a Population Proportion 9.4: P -Values	27	28 Easter Recess	29	30	
	31 Easter	1	2 Catch up and Review for Exam II	3	4 Exam II	5	6	
April	7	8	9 9.5: The Neyman-Pearson Lemma and Likelihood Ratio Tests 9.6: Further Aspects of Hypothesis Testing	10	11 10.1: The Two-Sample z Confidence Interval and Test 10.2: The Two-Sample t Confidence Interval and Test	12	13 Due: Lab 6	
	14	15	16 10.3: Analysis of Paired Data 10.4: Inference about Two Population Proportions	17	18 11.1: Single-Factor ANOVA 11.2: Multiple Comparisons in ANOVA	19	20	
	21	22	23 12.1 The Simple Linear and Logistic Regression Models 12.2 Estimating Model Parameters	24	25 Review for the Final Exam	26 **	27 Due: *** Lab 7	
	28	29	30	1-May	2-May	4:30 PM – 7:00 PM Final Exam		3-May

** The last *Written Homework* (April 15-26) will not be accepted after 1:00 pm on 26-Apr-2024.

***Lab 7 will not be accepted after 11:59 pm on 27-Apr-2024.