POINT 1902 LOMA
NAZARENE UNIVERSITY

Department of Mathematical, Information and Computer Sciences

MTH3063
Calculus Based Statistics with R
(3 units)

Fall 2021

Meeting days: **MWF**
Meeting times: **8:30-9:25 am**
Location: **RS295**
Final Exam: **10:30 am – 1:00 pm on Monday December 13th, 2021**

Instructor: **Professor Greg Crow, Ph.D.**
Phone: **619.849.2604**
Email: gcrow@pointloma.edu
Office location: **RS252**
Office hours: **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.

Course Description: (from the Catalog)
MTH 3063 (3 Units) Calculus Based Statistics With R

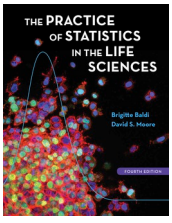
A first course in descriptive and inferential statistics for general students who have taken calculus. Topics include experimental design, sampling and sampling distributions, estimation and hypothesis testing. This course also provides a basic introduction to statistical analysis in the statistical software package R. Not applicable toward a major in Mathematics. Prerequisite(s): MTH 144 or MTH 164 or equivalent.

Course Learning Outcomes

- Students will be able to compute measures of central tendency for data.
- Students will be able to compute measures of dispersion for data.
- Students will be able to use statistical methods to make inferences from data.
- Students will be able to apply their technical knowledge to solve problems.

Required Texts and Recommended Study Resources

Text Book:	Baldi and Moore *The Practice of Statistics in the Life Sciences,* *4th Edition ©2018 by Macmillan Learning*
Statistical Software:	R and RStudio installed on your device
Calculator:	A scientific calculator is recommended



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 estimated 121 total hours meeting the course learning outcomes. The time estimations are provided below.

Component		**Total Hours**
Reading	(19 Chapters at 1.25 hours each)	23.75
Written Homework	(19 at 2.5 hours each)	47.5
Classes	(30 at 1 hour each)	30
Weekly Labs	(15 at 1 hours each)	15
Exams	(2 at 1 hours each)	2
Final Exam		2.5
Total		**121**

Assessment and Grading

Course Format

Mathematics is learned by doing. This course has intentionally been designed to develop both statistical understanding and practical implementation. You are encouraged to work with each other, however, you are responsible for the material and simply copying answers will be to your detriment. You will be required to install the software (R and RStudio) on your own computer or use a computer lab copy during the assigned sessions.

Homework:

You will have two types of homework:

Written Homework:

The homework is designed to allow you to grasp the concepts of Statistics; it is not an end in itself. Assignments will be announced on Monday and Wednesday. The work will be due on the following Tuesday. Please scan or photograph the pages, and upload the file to Canvas as a .pdf, .png, or .docx (but **not Google Docs**). If you use Google Docs, please export to a .pdf and upload that file. There may also be other activities that are completed as homework. 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.

Collected assignments must be prepared in a style suitable for grading. The following guidelines are used to determine credit:

- the organization must be easy to follow
- the work must be legible
- complete solutions must be written for problems (not just answers);
- answers must be clearly marked
- use complete sentences to answer questions

Labs:

The labs will be posted in Canvas and are due in Canvas at the scheduled times. Up to a maximum of one lab will be accepted up to 3 days late provided that consent is received from the professor before it is due. Labs 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. The Lab Final Examination will be included as 1/5th of the Final Examination score.

Grade Components:

Grade Component	Percent
Written Homework	15
Labs	15
Two Examinations at 15% each	30
Final Exam	40
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 the Examinations, 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:

Grading Scale in percentages	A	B	C	D
+		(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]
–	[90.0, 92.5)	[80.0, 82.5)	[70.0, 72.5)	[60.0, 62.5)

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.

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.

Incompletes and Late Assignments
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 and up to a maximum of one lab will be accepted up to 3 days late provided that consent is received from the professor before it is due. All physically submitted assignments are to be turned in by the beginning of the class session when they are due—including assignments posted in Canvas. All digitally submitted assignments are to be turned in by the due date and time listed in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

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 for definitions of kinds of academic dishonesty and for further policy information.

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 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.

PLNU Attendance and Participation 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 drop date or, after that date, receive the appropriate grade for their work and participation.

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. If absences exceed these limits but are due to university excused health issues, an exception will be granted.

> **Asynchronous Attendance/Participation Definition**
> A day of attendance in asynchronous content is determined as contributing a substantive note, assignment, discussion, or submission by the posted due date. Failure to meet these standards will result

in an absence for that day. Instructors will determine how many asynchronous attendance days are required each week.

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.

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.

Use of Technology
In order to be successful in the online or hybrid environment, you will need to meet the minimum technology and system requirements; please refer to the *Technology and System Requirements* 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 require 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.

Final Exam: Monday December 13th, 2021 from 10:30 am – 1:00 pm
The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

The Final Exam is a comprehensive examination.

Fall 2021

MTH3063 Calendar

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
August	29	30 On Tuesday 31st (Monday Schedule) Introduction Overview of Hybrid Course	31	1 Install both *R* and *RStudio* *Lab 1*	2	3 Open Lab	4 Read 1: Picturing Distributions with Graphs 2: Describing Distr. with Numbers
September	5	6 **Labor Day**	7	8 Activities 1: Picturing Distributions with Graphs 2: Describing Distr. with Numbers Homework 2	9	10 Open Lab	11 Read 3: Scatterplots & Correlation 4: Regression Analysis 5: Two-Way Tables Due: *Lab 1*
	12	13 Activities 3: Scatterplots & Correlation 4: Regression 5: Two-Way Tables Homework 3, 4, and 5	14	15 Lab 2 HW Due 2	16	17 Open Lab	18 Read 6: Samples & Observational Studies 7: Designing Experiments
	19	20 Activities 6: Samples & Observational Studies 7: Designing Experiments Homework 6 and 7	21	22 Open *R* Lab HW Due 3, 4, and 5	23	24 Open Lab	25 Read 9: Essential Probability 10: Independence & Conditional Prob. 11: Normal Distributions Due: *Lab 2*
	26	27 Activities 9: Essential Probability 10: Independence & Conditional Prob. 11: Normal Distributions Homework 9, 10, and 11	28	29 Lab 3 HW Due 6 and 7	30	1 Open Lab	2 Read 13: Sampling Distributions
October	3	4 Activities 13: Sampling Distributions Homework 13	5	6 Open *R* Lab HW Due 9, 10, and 11	7	8 Open Lab	9 Read 14: Introduction to Inference Due: *Lab 3*
	10	11 Activities 14: Introduction to Inference Homework 14	12	13 Lab 4 HW Due 13	14	15 Open Lab	16
	17	18 **Review for Exam**	19	20 **Exam 1** HW Due 14	21	22 Fall Break	23 Read 15: Inference in Practice 17: Inference about a Pop. Mean

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MTH3063 Calendar

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
October	24	25 Activities 15: Inference in Practice 17: Inference about a Pop. Mean Homework 15 and 17	26 **Spiritual Renewal Week**	27 **Exam 1 Returned** Open *R* Lab	28 **Spiritual Renewal Week**	29 Open Lab	30 Read 18: Comparing Two Means 24: One-Way Analysis of Var. Due: *Lab 4*
	31	1 Activities 18: Comparing Two Means 24: One-Way Analysis of Var. Homework 18 and 24	2	3 Lab 5 HW Due 15 and 17	4	5 Last Day to Drop Open Lab	6 Read 19: Inference Pop. Proportion
November	7	8 Activities 19: Inference about a Pop. Proportion Homework 19	9	10 Open *R* Lab HW Due 18 and 24	11	12 Open Lab	13 Read 20: Comparing Two Proportions Due: *Lab 5*
	14	15 Activities 20: Comparing Two Proportions Homework 20	16	17 Lab 6 HW Due 19	18	19 **Review for Exam** Open Lab	20
	21	22 **Exam 2**	23	24 Thanksgiving Recess	25	26	27 Read 22: Chi-Square Test (χ^2)
	28	29 Activities 22: Chi-Square Test (χ^2) Homework 22	30	1 **Exam 2 Returned** Lab 7 HW Due 20	2	3 Open Lab	4 Due: Lab 6
December	5	6 Open *R* Lab	7	8 **Lab Final Exam** HW Due 22	9	10 ** **Review for Final Exam**	11 *** Due: *Lab 7*
	12	13 **Final Exam** **10:30-1:00**	14	15	16	17	18

** No Written homework accepted after 4:00pm on 10-Dec-2021
*** No Labs accepted after 11:59pm on 11-Dec-2021