MICS/ Point Loma Nazarene University

MTH 2033: Linear Algebra

3 units

Spring 2025

When: Tuesday & Thursday 8:00 am – 9:15 am

Where: Rohr Science (RS) 295

Final Exam: Tuesday, 5/6, 7:30 – 10:00 am

INFORMATION	SPECIFICS FOR THE COURSE
Instructor title and name:	Dr. Catherine Crockett, Professor of Mathematics
Phone:	(619) – 849 - 2723
Email:	catherinecrockett@pointloma.edu
Office location and hours:	Rohr Science 222, MWF 8:30 to 9:30, T&TH 10:00 to 11:30, TH 1:00 to 2:00, F 10:30 to 12:00

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

A computational introduction to linear algebra with applications. A study of linear equations, matrix algebra, Euclidean spaces and subspaces, vector spaces, linear transformations, eigen values, eigenvectors, and inner products.

Prerequisite(s): MTH 1044 with a grade of C- or higher or MTH 1064 with a grade of C- or higher.

Program and Course Learning Outcomes

- Students will be able to apply their mathematical knowledge to solve problems.

- Students will be able to demonstrate facility with algebraic structures.
- Students will be able to speak about their work with precision, clarity and organization.
- Students will be able to write about their work with precision, clarity and organization.
- Students will collaborate effectively in teams.
- Students will be able to identify, locate, evaluate, and effectively and responsibly use and cite information for the task at hand.
- Students will be able to gather relevant information, examine information and form a conclusion based on that information.
- 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

Required Materials:

1. Textbook: Linear Algebra and Its Applications, 6th Edition by Lay, Lay, and McDonald (ISBN: 978-1292351216)
2. A calculator

Students are responsible for having the required course textbooks prior to the first day of class.

All supplemental materials posted on this course site (including articles, book excerpts, or other documents) are provided for your personal academic use. These materials may be protected by copyright law and should not be duplicated or distributed without permission of the copyright owner.

Assessment and Grading

Homework: Homework will be assigned every class meeting. All homework assigned in a week will be due on Thursdays of the following week. Please see the schedule below. These assignments are to be written up on paper or a PDF uploaded to CANVAS on or before the due date. 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 may be accepted up to 3 days late provided that consent is received from the professor before it due. Written homework that is submitted late without prior written consent will be recorded with a score of zero. The lowest homework score will be dropped prior to computing the final course grade.

Comments on homework:

- This is the minimum amount of homework that is required but you may need to do several odd numbered problems to make sure you get the answer in the textbook.
- Please be sure that your homework is legible, and the problems are in order. Issues with a Canvas upload are your responsibility. If your work cannot be viewed it will be marked as missing.
- **Homework will be scored on a combination of completeness and correctness. All work necessary to complete a problem must be shown to earn credit.**

- Start working on your homework early. These problems are difficult and meant to be done a little at a time over the course of a few days.
- When doing homework, please note it is normal to not be able to do every problem correct on the first attempt. Do not be discouraged, instead seek help.

Quizzes: There's a fair amount of evidence that regular quizzing (hence recall) is beneficial for the learning of new material. There is a lot of vocabulary, definitions and knowledge of counterexamples that are needed to make progress in this course. The quizzes will focus on these areas. Quiz content will be announced in class ahead of time. This is an opportunity for informal assessment of your progress in the course.

Examinations and the Final Examination: There are three exams and one final exam. The exams will include problems and questions over material assigned in the text, readings, and handouts, as well as material presented in class. If you do not take an exam, you will receive a zero for it. Late exams may be taken only by prior arrangement with me or a well-documented emergency beyond your control. The examination schedule is included in the daily schedule. Please note I do not intend to accept excuses such as poor communication with parents, benefactors, sport team sponsors and/or travel agents.

GRADING SCALE
A passing grade requires getting at least 60% in one of the two tests or on the final exam. Grades are based on the number of points accumulated throughout the course. Approximate minimal percentages required to obtain a given grade are:

Grading Scale in Percentages			
	A	B	C	D
+		(87.5, 90]	(77.5, 80]	(67.5, 70]
	(92.5, 100]	(82.5, 87.5]	(72.5, 77.5]	(62.5, 67.5]
−	(90, 92.5]	(80, 82.5]	(70, 72.5]	[60, 62.5]

GRADING DISTRIBUTION

Grade Distribution	
Two Exams scored at 20% each	40%
Final Exam (Cumulative)	35%
Quizzes	10%
Homework	15%
Total	100%

FINAL EXAMINATION POLICY

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.

INCOMPLETE 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. Late work need not be accepted. Make-up tests will be given only by prior arrangement with the instructor for reasons of documented emergency.
- **Incomplete grade:** Incompletes will only be assigned in extremely unusual circumstances. You may request a grade of I (incomplete) only if you are having a passing grade and at least 70% of the course work is completed.

Artificial Intelligence (AI) Policy

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 Academic Accommodations Policy

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 or 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.

Additional Course Information:

Additional PLNU policies and practices that apply to this course can be found at the following link:
https://docs.google.com/document/d/18i1pUoY0iCfB8w7JKxVvACQW309X-JRB/edit?usp=sharing&ouid=116164865489739533893&rtpof=true&sd=true

Week	In class - Tuesday	In class - Thursday
1 1/13-1/17	Introduction to the course and 1.1 & 1.2: Linear Systems & Matrices	1.2: Row Operations & Echelon Forms Quiz #1
2 1/20-1/24	1.3: Vector Equations & Applications	1.4: The Matrix Equation Ax=b Homework #1 Quiz #2
3 1/27-1/31	1.5: Solutions Sets of Linear Systems	1.7: Linear Independence 1.8: Intro. To Linear Transformations Homework #2 Quiz #3
4 2/3– 2/7	1.9: The Matrix of a Linear transformations	1.6 & 1.10: Applications Homework #3 Quiz #4
5 2/10- 2/14	2.1: Matrix Operations 2.2: The Inverse of a Matrix	2.2: The Inverse of a Matrix 2.3: Characterizations of Invertible Matrix Homework #4 Quiz #5
6 2/17 – 2/21	Review for Exam #1	**EXAM 1: Chapters 1.1 -1.10 and 2.1- 2.3** Homework #5
7 2/24-2/28	2.4: Partitioned Matrices 2.5: Matrix Factorizations	2.5: Matrix Factorizations 3.1: Introductions to Determinants Quiz #6
8 3/3- 3/7	3.2: Properties of Determinants 3.3: Cramer's Rule	4.1: Vector Spaces 4.2: Nule spaces, etc. Homework #6 Quiz #7
9 3/17 – 3/21	4.3: Linearly Independent Sets & Bases 4.4: Coordinate Systems	4.4: Coordinate Systems 4.5: Dimension of a Vector Space Homework #7 Quiz #8
10 3/24 -3/28	4.6: Change of Basis 5.1: Eigenvectors and Eigenvalues	5.1: Eigenvectors and Eigenvalues 5.2: The Characteristic Equation Homework #8 Quiz #9
11 3/31 – 4/4	5.3: Diagonalization 5.4: Eigenvectors & Linear Transformations	5.4: Eigenvectors & Linear Transformations Homework #9 Quiz #10
12 4/7 – 4/11	Review for Exam #2	**Exam 2: Chapters 2.4 -2.5, 3.1-3.3, 4.1- 4.6, 5.1 - 5.4** Homework #10
13 4/14- 4/18	6.1: Inner Product, Length and Orthogonality 6.2: Orthogonal Sets	**Easter Break No Classes**
14 4/21 –4/25	6.3: Orthogonal Projections 6.4: The Gram-Schmidt Process	6.4: The Gram-Schmidt Process 6.5: Least-Squares Homework #11 Quiz #11
15 4/28 – 5/2	7.1: Diagonalization of Symmetric matrices	Review Homework #12 Quiz #12

Finals Week 5/5 – 5/9	**Final Exam: May 6 (Tuesday) 7:30 am to 10:00 am**