

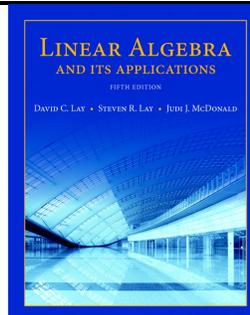
MTH233 (3 units)

Linear Algebra

MWF 1:30-2:25 pm RLC 112

Instructor: Greg Crow, Ph.D.
 Email: gcrow@pointloma.edu
 Phone: 619.849.2604
 Office: RS 252/(Science Trailer 1)
 Office Hours: Current Weekly Hours Posed in Canvas

Text Books: David C. Lay, Steven R. Lay, and Judi J. McDonald
Linear Algebra and its Applications,
 5th Edition
 ISBN: 978-0-321-98238-4



University Mission:

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.

Catalog Description:

MTH 233 (3 Units) Linear Algebra

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

Prerequisite(s): MTH 144 or MTH 164 or equivalent.

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.

Course Format

Mathematics is learned by doing. This course has intentionally been designed to develop both theory 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. Exam problems will be similar to these and it will be essential that you know how to do all of the problems from the homework.

Written Homework:

The homework is designed to allow you to grasp the concepts of Linear Algebra; it is not an end in itself. Assignments will be announced on Monday, Wednesday, and Friday. The work will be due on the following Friday (with a few exceptions). The problems from the text may be submitted as a hard copy or may be submitted by e-mail in Word or Excel format (but not in Google Docs). 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. 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

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.

Grade Components:

Grade Component	Percent
Two Examinations at 20% each	40
Final Exam	30
Written Homework and Activities	30
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)

Attendance:

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 drop date or, after that date, receive the appropriate grade for their work and participation. See [Attendance Policy](#) in the Undergraduate Academic Catalog.

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.

Academic Accommodations:

While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. (DRC@pointloma.edu or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

Academic Honesty:

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 [the catalog](#) for definitions of kinds of academic dishonesty and for further policy information.

Final Exam: Wednesday May 1st, 2018 1:30 – 4:00 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.

Copyright Protected Materials:

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.

Credit Hour:

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. Specific details about how the class meets the credit hour requirements can be provided upon request.

Spring 2019

MTH233 Calendar

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
January	6	On Tuesday 28 th (Monday Schedule) Introduction 1.1 Systems of Linear Equations	8	9	10	11	12
	13	14 1.4 Matrix Equation $Ax=b$	15	16 Computer Exercise	17	18 No Class	19
	20	21 Martin Luther King Jr. Day	22	23 1.5 Solution Sets of Linear Systems	24	25 1.6 Applications of Linear Systems	26
	27	28 1.7 Linear Independence Spiritual	29 -----	30 1.8 Introduction to Linear Transformations Renewal	31 -----	1 1.9 The Matrix of a Linear Transformation Week	2
February	3	4 1.10 Linear Models in Business, Science, and Engineering	5	6 Catch-Up	7	8 2.1 Matrix Operations	9
	10	11 2.2 The Inverse of a Matrix	12	13 2.3 Characterizations of Invertible Matrices	14	15 2.4 Partitioned Matrices	16
	17	18 2.5 Matrix Factorizations	19	20 3.1 Introduction to Determinants	21	22 3.2 Properties of Determinants	23
	24	25 4.1 Vector Spaces and Subspaces	26	27 Review for Exam I	28	1 Exam I	2
March	3	4 Spring	5 -----	6 Break	7 -----	8 Week	9
	10	11 4.2 Null Spaces, Column Spaces, and Linear Transformations	12	13 4.3 Linearly Independent Sets; Bases	14	15 4.4 Coordinate Systems	16
	17	18 4.5 The Dimension of a Vector Space	19	20 4.6 Rank	21	22 Catch-Up	23
	24	25 5.1 Eigenvectors and Eigenvalues	26	27 5.1 Eigenvectors and Eigenvalues 5.2 The Characteristic Equations	28	29 5.2 The Characteristic Equations	30
April	31	1 5.3 Diagonalization	2	3 5.4 Eigenvectors and Linear Transformations	4	5 6.1 Inner Product, Length and Orthogonality	6
	7	8 6.2 Orthogonal Sets	9	10 Review for Exam II	11	12 Exam II	13
	14	15 6.3 Orthogonal Projections	16	17 6.4 The Gram-Schmidt Process	18	19	20
	21 Easter	22	23	24 6.5 Least-Squares Problems	25	26 Final Exam Review	27
	28	29	30	1 Final Exam 1:30 - 4:00 pm	2	3	4 Commencement