

**MTH 2033 (3 units) Linear Algebra**  
**MWF 8:30-9:25 am RS 295**

**Instructor:** Robert Compton, Ph.D.  
**Office Hours:** MW 12:30-2:00, Tues 2:00-3:00  
 Others by arrangement

**Office:** Rohr Science 278  
**Phone:** 619.849.2715  
**Email:** [rcompton@pointloma.edu](mailto:rcompton@pointloma.edu)

**Required Materials**

*Linear Algebra, 5th ed.* Lay, David C. 2011. ISBN: 978-0321836144

**Point Loma Nazarene 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 becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.*

**MICS 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 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:** Mathematics 1044 or 1064

**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.

**Course Philosophy**

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 and consult the internet, 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.

**Grading Policies**

Grading Distribution	Percent
Two Examinations at 20% each	40
Final Exam	30
Homework and Activities	25
Literature Review	5
Total	100

**Grading scale**

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)

**Grade components:**

The grade components are homework (text exercises), tests, and the final examination.

- **Late work.** A written assignment or computer assignment is late if it is not received at the beginning of class on the due date. Late work need not be accepted. Work accepted late may be assessed a penalty. Make-up tests will only be given by arrangement with the instructor for reasons of documented emergency.
- **Accuracy of solutions.** Written assignments and examination questions and problems must be formulated carefully in terms of words and symbols used in the course. Credit is determined by the degree to which answers and solutions respond to the specific question or problem stated. Maximize your credit by learning the language and symbols of the course.
- **Written Assignments.** 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
- **Literature Reviews:** You will be responsible for finding two journal article applying tools from linear algebra and then writing a brief summary to present to the class. Grading details and dates will be provided in class.
- **Examinations and the Final Examination.** 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.

No examination shall be missed without prior consent or a well-documented emergency beyond your control. 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 examination schedule is included in the daily schedule. This instructor does not intend to accept excuses such as poor communication with parents, benefactors, surf team sponsors and/or travel agents.

**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 [http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class\\_Attendance](http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance) 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 [http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic\\_Honesty](http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Honesty) for definitions of kinds of academic dishonesty and for further policy information.

**Final Exam: 7:30-10:00 AM, Monday May 4, 2016**

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.

**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.

**Cell Phones:** Turn off any cell phone, pager or things that make noise while you are in class. Also, do not text or work on other classes while in class -to do so is disrespectful to me and your classmates.

**General Advice:** The key to success in this class is to attend lectures regularly and do your homework. You learn mathematics by doing it yourself. You should expect to spend approximately two hours outside of class working on homework and going over concepts for every one hour in class. When doing your homework, please note it is normal to not be able to do every problem correctly on the first attempt. Do not be discouraged, instead, seek help.

**Sources of Help:**

1. Me. If you have questions, ask me. See office hours.
2. FREE TUTORING- Math Learning Center, RS-230. Hours are posted on the door.
3. Other classmates. Form study groups! Work together!

**The Final Exam is 7:30-10:00 Monday May 4, 2016 and it is a Comprehensive Examination.**

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## Tentative Class Schedule - Subject to Change

Week	Monday	Wednesday	Friday
1	1/14 Tuesday Class 1.1 Systems of Linear Equations	1/15 1.2 Row Reduction and Echelon forms	1/17 1.3 Vector Equations
2	1/20 Martin Luther King Day---No Class	1/22 1.4 Matrix Equation	1/18 1.5 Solution Sets
3	1/27 1.6 Applications	1/29 More applications	1/31 1.7 Linear Independence
4	2/3 1.8 Intro to Linear Transformations	2/5 1.9 Linear Transformations	2/7 1.10 Linear Models
5	2/10 Catch up day	2/12 2.1 Matrix Operations	2/14 2.2 The Inverse of a Matrix
6	2/17 2.3 Characteristics of Inverse Matrices	2/19 2.4 Partitioned Matrices	2/21 2.5 Matrix Factorizations
7	2/24 2.8 Computer Graphics	2/26 Review	2/28 <b>EXAM I</b>
8	3/2 3.1 Introduction to Determinants	3/4 3.2 Properties of Determinants	3/6 3.3 Cramer's Rule
9	3/16 4.1 Vector spaces	3/18 4.2 More spaces	3/20 4.3 Bases
10	3/23 4.4 Coordinate Systems	3/25 4.5 Dim of a Space	3/27 4.6 Rank
11	3/30 5.1 Eigenvectors and Eigenvalues	4/1 5.1-5.2	4/3 5.2 The Characteristic Equations
12	4/6 5.3 Diagonalization	4/8 5.4 Eigenvectors -Linear Transforms	4/10 Easter Recess - No Class
13	4/13 Review	4/15 <b>EXAM II</b>	4/17 6.1 Inner Product
14	4/20 6.2 Orthogonal Sets	4/22 6.3 Orthogonal Projections	4/24 Literature Review
15	4/27 6.4 Gram-Schmidt Process	4/29 6.5 Least Squares	5/1 Review
Finals Week	5/4 7:30 AM - 10 AM <b>FINAL EXAM</b>		