

Course: MTH 435 - Linear Algebra

Date: August 3, 2009

Instructor: Tony DiMauro

email: tdimauro@gmail.com

Textbook: Linear Algebra, David C. Lay, 3rd Edition

Course Prerequisites: MTH 325 and MTH 220

Course Description An examination of systems of linear equations and matrices, elementary vector-space concepts and geometric interpretations. Discusses finite dimensional vector spaces, linear functions and their matrix representations, determinants, similarity of matrices, inner product, rank, eigenvalues and eigenvectors, canonical form and Gram-Schmidt process. Computer software demonstrates computational techniques with larger matrices. Graphing calculator or appropriate software may be required.

Learning Outcomes

The main goal of the course is to develop student's ability to formulate and solve linear problems in terms of the concepts and with the use of methods studied in linear algebra. After completing the course a student should be able to:

- 1 Demonstrate proficiency in correct formulation and solving linear problems in terms of systems of linear equations in matrix notation.
- 2 Have a strong knowledge of mathematical vocabulary and notation of matrix algebra.
- 3 Have a clear understanding of the concepts of vector spaces and linear transformations.
- 4 Show ability to work with inner products and orthogonal matrices, to solve eigenvalue problems.
- 5 Know how to apply the linear algebra techniques to handle linear mathematical models solving systems of linear differential equations, least squares fitting to data problems.

Goals

Linear algebra is an introductory course on the principles and application of this topic in mathematics. The scope of the course includes the study of determinants, matrices, vector spaces, and eigenvalues. The emphasis of this course is on active student involvement in problem solving. Matrix Theory and related vector-space concepts as a language and powerful computational framework for posing and solving important problems in business, economics, natural and social sciences, computer science and engineering and mathematics. System of linear equations and matrices, elementary vector-space concepts and geometric interpretations. Computer software will demonstrate practice in computational techniques with larger matrices. An appreciation of the diverse historical development that prompted the rise of Matrix Theory will include the ideas and contributions of its major contributors: Gauss, Cayley, Cauchy, Hamilton, Fourier, Noether, Sylvester, and Jacobi. Writing assignments will be provided. (Graphing calculator or appropriate software may be required). The over-all aims of this course are to develop a students ability in the use of linear algebra and to explain mathematical models of the real world. As part of this goal, students will:

- 1 Develop a mathematical vocabulary and comfort with notation.
- 2 Use matrix operations.
- 3 Learn the procedures for evaluating determinants.
- 4 Understand the concept of vector spaces.
- 5 Learn to work with eigenvalues.
- 6 Practice the application of linear algebra technique.

Course Content

This course covers the following critical topics:

- 1 Systems of linear equations and matrices.
- 2 Elementary vector-space concepts and geometric interpretations.
- 3 Finite dimensional vector spaces.
- 4 Linear functions and their matrix representations.
- 5 Determinants.
- 6 Similarity of matrices.
- 7 Inner product.
- 8 Rank.
- 9 Eigenvalues and eigenvectors.
- 10 Canonical form.
- 11 Gram-Schmidt process.

Course Requirements	#	Points	Total Points
Homework Assignments	9	20	180
Nightly Quizzes	8	25	200
Saturday Tests	2	100	200

Course Grading (expressed as percentages):

A	94-100	B+	83-88	C+	68-72	D+	53-58
A-	88-94	B	77-83	C	63-68	D	48-53
		B-	72-77	C-	58-63	D-	43-48

Undergraduate Courses

A	Outstanding Achievement	<i>Significantly exceeds standards</i>
B	Commendable Achievement	<i>Exceeds standards</i>
C	Acceptable Achievement	<i>Meets standards</i>
D	Marginal Achievement	<i>Below standards</i>
F	Failing *	

Incomplete: A grade given at the discretion of the instructor when a student who has completed at least two-thirds of the course class sessions and is unable to complete the requirements of the course because of uncontrollable and unforeseen circumstances. The student must convey these circumstances (preferably in writing) to the instructor prior to the final day of the course. If an instructor decides that an "Incomplete" is warranted, the instructor must convey the conditions for removal of the "Incomplete" to the student in writing. A copy must also be placed on file with the Office of the Registrar until the "Incomplete" is removed or the time limit for removal has passed. An "Incomplete" is not assigned when the only way the student could make up the work would be to attend a major portion of the class when next offered. An "I" that is not removed within the stipulated time becomes an "F." No grade points are assigned. The "F" is calculated in the grade point average.

Withdrawal: Signifies that a student has withdrawn from a course after beginning the third class session. Students who wish to withdraw must notify their admissions advisor before the beginning of the sixth class session in the case of graduate courses, or before the seventh class session in the case of undergraduate courses. Instructors are not authorized to issue a "W" grade.

Math 435 - Nightly Schedule of Events

Class time is at 5:30 pm to 10 pm each night with a dinner break at 7:00 pm

	Monday	Wednesday
1	August 3, 2009 5:30 Introduction Ch 1 Sec 1-2 7:00 Break - Individual Help 7:30 Ch 1 Sec 3-4 9:00 Quiz 1 9:30 Individual Help Homework 1: [C1S1: 1-24, 29-33], [C1S2: 1-28], [C1S3: 1-21, 22-28], [C1S4: 1-26, 29-33] Watch MIT Lecture 1-2	August 5, 2009 5:30 HW Review Ch 1 Sec 5-6-7 7:00 Break - Individual Help 7:30 Ch 1 Sec 8-9-10 9:00 Quiz 2 9:30 Individual Help Homework 2: [C1S5:], [C1S6:], [C1S7: 8], [C1S8:], [C1S9:], [C1S10:] Watch MIT Lecture 3-4
2	August 10, 2009 5:30 HW Review Ch 2 Sec 1-2-3 7:00 Break - Individual Help 7:30 Ch 2 Sec 4-5 9:00 Quiz 3 9:30 Individual Help Homework 3: Watch MIT Lecture 5-7-8	August 12, 2009 5:30 HW Review Ch 2 Sec 8-9 7:00 Break - Individual Help 7:30 Ch 3 Sec 1-2-3 9:00 Quiz 4 9:30 Individual Help Homework 4: Watch MIT Lecture 18-19-20
S A T	August 15, 2009 8:00 HW Review Chapter 1-2-3 10:00 Study Break 11:00 Test 1 (90 min) Homework 5: Watch MIT Lecture 6-9	
3	August 17, 2009 5:30 HW Review Ch 4 Sec 1-2-3 7:00 Break - Individual Help 7:30 Ch 4 Sec 4-5-6-7 9:00 Quiz 5 9:30 Individual Help Homework 6: Watch MIT Lecture 10-11	August 19, 2009 5:30 HW Review Ch 5 Sec 1-2 7:00 Break - Individual Help 7:30 Ch 5 Sec 3-4 9:00 Quiz 6 9:30 Individual Help Homework 7: Watch MIT Lecture 21-22-23-24
4	August 24, 2009 5:30 HW Review Ch 5 Sec 6 7:00 Break - Individual Help 7:30 Ch 6 Sec 1-2 9:00 Quiz 7 9:30 Individual Help Homework 8: Watch MIT Lecture 14-15	August 26, 2009 5:30 HW Review Ch 6 Sec 3-4 7:00 Break - Individual Help 7:30 Ch 6 Sec 5-6-7 9:00 Quiz 8 9:30 Individual Help Homework 9: Watch MIT Lecture 16-17
S A T	August 29, 2009 12:30 HW Review Ch 4-5-6 2:30 Study Break 3:30 Test 2 (90 min)	

Plagiarism

Plagiarism is the presentation of someone else's ideas or work as one's own. Students must give credit for any information that is not either the result of original research or common knowledge. If a student borrows ideas or information from another author, he/she must acknowledge the author in the body of the text and on the reference page. Students found plagiarizing are subject to the penalties outlined in the Policies and Procedures section of the University Catalog, which may include a failing grade for the work in question or for the entire course. The following is one of many websites that provide helpful information concerning plagiarism for both students and faculty: <http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml>

Ethics

Ethical behavior in the classroom is required of every student. The course will identify ethical policies and practices relevant to course topics.

Technology

Students are expected to be competent in using current technology appropriate for this discipline. Such technology may include word processing, spreadsheet, and presentation software. Use of the internet and e-mail may also be required.

Diversity

Learning to work with and value diversity is essential in every class. Students are expected to exhibit an appreciation for multinational and gender diversity in the classroom.

Civility

As a diverse community of learners, students must strive to work together in a setting of civility, tolerance, and respect for each other and for the instructor. Rules of classroom behavior (which apply to online as well as onsite courses) include but are not limited to the following:

- 1 Conflicting opinions among members of a class are to be respected and responded to in a professional manner.
- 2 Side conversations or other distracting behaviors are not to be engaged in during lectures, class discussions or presentations
- 3 There are to be no offensive comments, language, or gestures

Students with Disabilities

Students seeking special accommodations due to a disability must submit an application with supporting documentation, as explained under this subject heading in the General Catalog. Instructors are required to provide such accommodations if they receive written notification from the University.

Writing Across the Curriculum

Students are expected to demonstrate writing skills in describing, analyzing and evaluating ideas and experiences. Written reports and research papers must follow specific standards regarding citations of an author's work within the text and references at the end of the paper. Students are encouraged to use the services of the University's Writing Center when preparing materials.

The following website provides information on APA, MLA, and other writing and citation styles that may be required for term papers and the like: <http://www.nu.edu/LIBRARY/ReferenceTools/citations.html>

National University Library

National University Library supports academic rigor and student academic success by providing access to scholarly books and journals both electronically and in hard copy. Print materials may be accessed at the Library in San Diego or through document delivery for online and regional students. Librarians are available to provide training, reference assistance, and mentoring at the San Diego Library and virtually for online or regional students. Please take advantage of Library resources.