

MTH 221 Linear Algebra

Syllabus and Assignments

- Instructor:** [Steven J. Leon](#)
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Office hours: Thurs 10:00, Mon and Wed 1:30 - 3:00
or by appointment These office hours may be revised during the semester. Professor Leon is generally available in his office at many times during the week.
- Instructor's home page:** www.umassd.edu/cas/mathematics/people/leon/
- Textbooks:** **Linear Algebra With Applications**, 8th ed., by Steven J. Leon
ATLAST Computer Exercises for Linear Algebra, 2nd edition by Leon, Faulkenberry, and Herman,
Student Study Guide by Steven J. Leon
- Exams:** There will be two exams each worth 100 points and either a third exam worth 100 points or a quiz worth 50 or 60 points. The final exam is worth 200 points. If the final exam score gives evidence of improvement, the instructor may, at his discretion, weigh the final exam more heavily. No make-ups unless you have a note from your doctor. The exams will be closed book. You are not allowed to use notes during the exam. Hand calculators are also not allowed on exams. You must show your work in solving exam problems. If you have a correct answer to a problem but have not shown your work, you could end up not receiving any credit for the problem. Exams are *not* graded on a curve. The grading scale for a 100 point exam is roughly
90-100 A, 80-89 B, 70-79 C, 60-69 D, Below 60 F
In preparation for exams students should work through the chapter tests at the end of each chapter.
- Assignments:** Assignments are posted below. As soon as we have covered a section in class you should work the assignments for that section. If you have trouble working any of the homework problems you should ask about them in class or see the instructor for help. There will also computing projects using MATLAB. There may also be MATLAB group projects. All homework is to be handed in. You will receive an overall grade for your assignments, however, not every exercise in each assignment will be graded. As with exams, you are expected to show your work on homework

assignments. You will lose credit for any homework turned in late (unless you have a doctor's excuse) and you will lose full credit for homework that is more than 3 days late.

- Course Objectives:**
1. Students should be able to do the homework problems in the book and similar types of problems that may occur on exams.
 2. Students should know and be able to state the definitions of the basic course concepts such as: subspace, span, linear independence, basis, dimension, rank, eigenvalue, and eigenvector. These basic definitions should be memorized. (Not all definitions need be memorized verbatim, just the most important ones.)
 3. Students should know and understand what all of the theorems say. To test this they will be asked to answer simple questions as to the mathematical theory and to explain their answers.
 4. Students will be expected to do simple proofs.
 5. Students will be expected to learn the basics of the MATLAB software package and to be able to use it to do assigned problems and projects.

Grading: Your grade for the course will be based on how well you score on the midterm exams, the final exam, and the assignments. The regular homework assignments will count a total of 150 points. MATLAB assignments will count 50 points. As with the exams, a curve will not be used in assigning grades..

Attendance: Attendance will be taken at each class session. Students will be expected to attend regularly and should bring in doctor's notes if they miss class due to illness. Students with more than 2 unexcused absences will receive failing grades for the course.

Academic integrity: **Academic dishonesty will not be tolerated.** Any student caught cheating on an exam will receive an F for the course and a note will be sent to the university authorities regarding the incident. This could result in the expulsion of the student from the university. Academic dishonesty includes using crib notes, copying from another student or letting another student copy from you during an exam.

Chapter 1:	Matrices and Systems of Equations
Topics:	1 - Systems of Linear Equations
	2 - Row Echelon Form
	3 - Matrix Arithmetic

	4 - Matrix Algebra
	5 - Elementary Matrices
	6 - Partitioned Matrices
	Introduction to MATLAB software
Assignments:	Chapter 1
	1.1 Exercises 1a,b,c, 2a,b,c, 3a,b,d, 4a,b,d, 5a,c 6a,c,e,g, 7, 9, 10, 11
	1.2 Exercises 1, 2, 3c,e,f, 4c,e,f, 5a,c,e,g,i,k, 6a,c, 8- 10, 13-15, 21
	1.3 Exercises 1a,c,e,g, 2, 3, 4b, 7, 9 -16
	1.4 Exercises 1-5, 7-9, 10a,c,d, 11a,b,c, 12, 13c, 14, 17, 21, 28, 33-35
	1.5 Exercises 1-5, 8a,c, 10a,c,e,g, 11-13, 15, 16, 18, 23-27, 29-31
	1.6 Exercises 1a,c,e, 3, 4a,c, 5a,c, 6, 8, , 12-17, 19
	MATLAB Projects: (from the ATLAST book) p. 10 - Project 5 (ski jump), do all parts (a)-(h) p. 29 - Project 4 (airline routes)
Review	Do Chapter tests A and B for Chapter 1. In class review for first exam.
Exam 1	
Chapter 2:	Determinants
	8 - Determinant of a Matrix
	9 - Properties of Determinants
Assignments:	Chapter 2
	2.1 Exercises 1, 2 3a,c,e,g, 4, 5, 6
	2.2 Exercises 1a,c, 4-7, 9a,b,c,f, 10, 11, 12, 14-16
Chapter 3	Vector Spaces
Topics	10 - Definition and Examples
	11 - Subspaces and Span
	12 - Linear Independence
	13 - Basis and Dimension
	14 - Change of Basis
	15 - The Row Space and Column Space

Assignments	Chapter 3
	3.1 Exercise 1, 3, 4
	3.2 Exercises 1a,b,c,d, 2, 3a,c,f,g, 4a,b,c, 8, 9a,c, 10a,c, 11-15, 19
	3.3 Exercises 1-3, 4b,c, 5-7, 14-20
	3.4 Exercises 1-3, 5-10
	3.5 Exercises 1-3, 5-8
	3.6 Exercises 1a,c, 2b,c, 3, 4a,c,d, e, 5a,c,d,e, 6-14, 16-20
	MATLAB assignment ATLAST Book: page 77: Project 4, a concrete application
Review	Do Chapter tests A and B for Chapter 2 and 3. 1. In class review of both chapters for 2nd exam.
Exam 2	Exam covering Sections 2.1 and 2.2, and all of Chapter 3.
Chapter 6	Eigenvalues
	16 - Eigenvalues and Eigenvectors
	17 - Diagonalization
Assignments	Chapter 6 (If time allows we will also cover Chapter 4)
	6.1 Exercises 1a,c,e,g,i,k, 2-5, 7, 10, 11, 13, 14, 16, 18-20, 24,26, 27, 29, 31 MATLAB exercises 1-8 on pages 399-400.
	6.3 Exercises 1a,c,e, 2a,c,e, 3a,c,e, 7, 8a,c,e,g, 9, 10, 18, 19
Review	Do Chapter Test 6A Exercises 1-6, Chapter test 6B Exercises 1 - 4 If Chapter 4 is covered in class, work through Chapter tests A and B. In class review for Exam 3
Exam 3	Either an exam covering Chapter 4 and Sections 1 and 3 of Chapter 6 or a Quiz on the 2 sections from Chapter 6.
Final Exam	Wednesday, December 21, 11:30 - 2:30