

MTH 353 Applied Linear Algebra

Instructor:	Steven J. Leon , Department of Mathematics Office: Group I-394D Office hours: Tues, Thurs 2:00 -3:00, Mon, Wed 1:30 - 2:30, or by appointment. These office hours may be revised during the semester. Email: sleon@umassd.edu phone: 508 999-8320
Textbooks:	Linear Algebra With Applications, 8th ed. , by S. J. Leon
Homework:	Homework assignments are listed below for each of the sections. Homework will be collected and graded. Show your work on all homework assignments.
Exams:	There will be 2 in-class exams worth 100 points each and possibly a third exam worth 50 points. There will be a final exam worth 200 points. 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 may be used for arithmetic and to check your answers, but you must show all of your work in solving exam problems. If you have a correct answer to a problem, but have not shown your work, you may not receive any credit for the problem. Exams are <i>not</i> graded on a curve.
Grading:	Your grade for the course will be based on how well you score on the homework, in-class exams, and the final exam.
Academic integrity:	Academic dishonesty will not be tolerated. Any student caught cheating on an exam will receive an F for the course. Academic dishonesty includes using crib notes, copying from another student or letting another student copy from you during an exam.

UNIT 1: Orthogonality

Topics: 1 - Scalar Product and Orthogonality in R^n

2 - Orthogonal Subspaces

3 - Least Squares Problems

4 - Inner Products and Norms

5 - Orthonormal Sets

6 - Orthogonal Matrices

7 - Gram-Schmidt Process

8 - QR Factorization from Gram-Schmidt Process

Assignments: Chapter 5

Section: 5.1 Exercises 1 – 3 parts a and c, 4 , 5, 13, 14, 17, 20

5.2 Exercises 1 – 4, 6 – 9, 12 – 17

5.3 Exercises 1 – 6, 9 – 14
5.4 Exercises 1 – 4, 7 – 9, 15, 16, 18, 21 – 26, 28, 30
5.5 Exercises 1 – 8, 11, 12, 14, 16, 17, 19 – 25, 29, 30, 35
5.6 Exercises 1 – 5, 7, 8, 12, 13
MATLAB Exercises or projects (possibly)
Review of Unit 1

Test 1 Exam covering Sections 5.1-5.6

UNIT 2: Eigenvalues

Topics: 9 - Review of Eigenvalues, Eigenvectors and Diagonalization
10 - The Matrix Exponential
11 - Applications to Linear Systems of Differential Equations
12 - Hermitian Matrices
13 - Singular Value Decomposition
14 - Quadratic Forms and Optimization
15 - Positive Definite Matrices

Assignments: Chapter 6

Section: 6.2 Exercises 1a, c, e, 2 a, c, 3, 4, 5a
6.3 Exercises 20, 22, 28, 29 a, c, 39a, c, 32, 33
6.4 Exercises 1 – 4, 5 a, c, e, g, 6,7,8,10, 12, 15, 18, 26, 27
6.5 Exercises 1 – 7, 8, 10, 12
6.6 Exercises 1,6, 7a,c,e,f, 8 – 14
6.7 Exercises 1a, c, 2, 3, 4 a, c, 5 a, c, 6, 8 – 11, 13
MATLAB Exercises (possibly)
Review of Unit 2

Test 2 Exam covering all of unit 2

UNIT 3: Numerical Linear Algebra (We will cover as much of this unit as time allows)

Topics: 15 - Solving Linear Systems with Pivoting
16 - Matrix Norms and Condition Numbers
17 - Householder Transformations
18 - Rotations and Reflections
19 - The Eigenvalue Problem
20 - Least Squares Problems

Assignments: Chapter 7

Section: 7.4 Exercises 1, 4, 6 – 9, 11, 12, 14 - 18, 23, 24, 25, 31-38, 41, 42
7.5 Exercises 1, 2 a, c, 3 a, c, 4 – 6, 7a, c, 11–16
7.6 Exercises 1– 8, 12, 13a

7.7 Exercises 1 – 3, 6 – 11

MATLAB Exercises

Test 3 Exam covering all or part of unit 3 (if time allows)

Final exam: Fri., May 13, 11:30 - 2:30 Comprehensive exam over all sections covered during the semester