SUNY OLD WESTBURY

Department of Mathematics, Computer & Information Science

Linear Algebra
MA3160 ● SYLLABUS SUMMER 2025

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TEXTBOOK: Elementary Linear Algebra: Applications Version 12th Edition by Howard Anton, Chris Rorres, & Anton Kaul. Wiley, 2019.

ISBN-10 : 1119666147
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PREREQUISITES: Grade of C or higher in Calculus I MA 2310.

COURSE DESCRIPTION: This course discusses the main concepts and terminology of linear algebra. Some of the topics included are systems of linear equations, matrices and determinants, vectors in 2-space and 3-space, Euclidean vector spaces, general vector spaces, subspaces, linear independence, bases and dimension, eigenvectors and eigenvalues, diagonalization, and linear transformations. We will also cover the Gram-Scmidt orthoganalization technique for Euclidean space as well as a few applications of linear algebra such as encryption, sequence representation or Markov Chains.

COURSE OBJECTIVES: Upon successful completion of this course students should: be able to solve systems of linear equations using a variety of methods; carry out the basic operations of matrix algebra; interpret the geometric properties of vectors in Euclidean n-space; define linear transformation and represent by matrices; comfortable with the axiomatic definitions of general vector spaces; determine whether a specified set of vectors forms a subspace; understand the notion of span and basis; calculate eigenvalues and eigenvectors of a square matrix; determine when a matrix is diagonalizable; write proofs of statements involving vector spaces, subspaces, linear independence, basis, and linear transformation.

COURSE EVALUATION & GRADING: Your grade for the course will be based on your homework/quiz performance (10%), two to three tests (50%) and a comprehensive final exam (30%).

		B+	87-89	C+	77-79	D+	67-69		
A	93-100	B	83-86	C	73-76	D	63-66	F	0-69
A-	90-92	B-	80-82	C-	70-72	D-	60-62		

CALCULATOR: No calculator is allowed nor needed.

ACADEMIC INTEGRITY POLICY

As members of the Old Westbury community, students are expected to adhere to standards of honesty and ethical behavior. Plagiarism and other types of academic dishonesty are condemned at all academic institutions. These acts detract from the student's intellectual and personal growth by undermining the processes of higher learning and the struggle with one's own expression of ideas and information.

Good academic procedure requires giving proper credit when using the words or ideas of others.

Plagiarizing means "presenting somebody else's words or ideas without acknowledging where those words and ideas come from" (Ann Raimes, Keys for Writers, 7th ed., p.135). Examples include:

- copying material from the Internet or other sources and presenting it as one's own
- using any author's words without quotation marks; using any quotation without credit
- changing any author's words slightly and presenting them as one's own
- using ideas from any source (even in one's own words) without proper credit
- turning in any assignment containing material written by someone else (including tutor or friend); buying work and submitting it as one's own
- submitting the same assignment in more than one class without permission of the instructor

Know what plagiarism is and how to avoid it; for guidance see Raimes or any other college writing handbook.

Other types of academic dishonesty include unauthorized collaboration or copying of students' work (cheating); falsifying grades or other assessment measures; destroying the academic work of another student; the dishonest use of electronic devices; and others. When detected and verified, plagiarism and other academic dishonesty will have serious consequences.

Please note: In this matter, ignorance of the Academic Integrity Policy is never an acceptable excuse.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES:

If you have or suspect you may have a physical, psychological, medical or learning disability that may impact your course work, please contact Stacey DeFelice, Director, The Office of Services for Students with Disabilities (OSSD), NAB, 2065, Phone: 516-628-5666, Fax (516) 876-3005, TTD: (516) 876-3083. E-mail: defelices@oldwestbury.edu.

The office will help you determine if you qualify for accommodations and assist you with the process of accessing them. All support services are free and all contacts with the OSSD are strictly confidential. SUNY/Old Westbury is committed to assuring that all students have equal access to all learning activities and to social activities on campus.

RESPECT: No cell phones in class and no texting.

FINAL EXAM: Will be held Jul 03, 2025 in our regular classroom at the regular class time.

Topics Covered
Chapter 1: Systems of Linear Equations and Matrices
Chapter 2: Determinants
Chapter 3: Euclidean Vector Spaces
Chapter 4: General Vector Spaces
Chapter 5: Eigenvalues and Eigenvectors
Chapter 6: Inner Product Spaces (including Gram-Schmidt Orthoganlization)
Chapter 7: Diagonalization and Quadratic forms

Assignments

1 Systems of Linear Equations and Matrices 1
- 1.1: 9,11
- 1.2: 5,7,9,11,13,43
- 1.3: 4,5,13
- 1.4: 1,3,4,5,6,10,11,15,17,21
- 1.5: 1,3,my problems
- 1.6: 1,3,7
- 1.7: 1,7,11,13
- 1.8: 1,3,14,19, 23, 27, 29,37
- 1.9: 1,7,8

2 Determinants 118
- 2.1: 5,15,16,21,23,33
- 2.2: 1,3,5
- 2.3: 1.5, 24,26

3 Euclidean Vector Spaces 146
- 3.1: 3,5,12,15,18,19,25
- 3.2: 1,3,5,11,12,13,15
- 3.3: 1,3,7,11,15,27
- 3.4:
- 3.5: 1,7,9,11,13,15,19,21,29

4 General Vector Spaces 202
- 4.1: 1,2,4,5
- 4.2: 1,3,4,5,13b
- 4.3: 1,3,7,9
- 4.4: 1,2,4
- 4.5: 1,2,3,4
- 4.6: 1,7,8,11,17
- 4.7: 1,3,
- 4.8: 3,7,9
- 4.9: 1,2,3,7,8

5 Eigenvalues and Eigenvectors 291
- 5.1: 5,7,15,16,19
- 5.2: 1,3,5,7,9
- 5.3: 15, 16, 17
- 5.5: Problems from class

6 Inner Product Spaces 341
- 6.3: 7,10,11,14,42,43

7 Diagonalization and Quadratic Forms 399

- Worksheet 1

  8 General Linear Transformations 446

- Worksheet 2

Course Schedule

- Jun 02. 1.1,1.2,1.3
- Jun 03. 1.3,1.4,1.5
- Jun 04. 1.6, 1.7, 1.8
- Jun 05. 1.8, 1.9, 2.1, 2.3

- Jun 09. Test 1 and 2.2
- Jun 10. 3.1, 3.2
- Jun 11. 3.3, 3.5, 4.1
- Jun 12. 4.2, 4.3,4.4

- Jun 16. 4.4, 4.5, 4.6
- Jun 17. 4.6, 4.7, Review
- Jun 18. Test 2
- Jun 19. Off Juneteenth

- Jun 23. 4.8, 4.9
- Jun 24. 5.1, 5.2
- Jun 25. 5.2, 5.3
- Jun 26. 6.3, 7.1. 7.2

- Jun 30. 5.5, Test 2.5
- Jul 01. Cryptography/PageRank Algorithm
- Jul 02. Review
- Jul 03. Final Exam