Math 2318.101H1
Linear Algebra
Spring 2025
T Th 2:00 – 3:50, STEM 105

Instructor Information

Dr. Jason Duvall
jduvall3@com.edu
409.933.8381

Student (Office) Hours and Location

M W	2:00 – 3:30	STEM 325.18
T Th	4:00 – 5:30	STEM 325.18
F	11:00 – 12:30	Tutoring Center

Required Textbook/Materials

Lay, David C., Steven R. Lay, and Judi J. McDonald. *Linear Algebra and Its Applications*. 6th ed., Pearson, 2020. ISBN-13: 978-0135851258.
Note: Course materials are available for free via MyLab Math in Brightspace/D2L (no purchase necessary).

Course Description

Introduces and provides models for application of the concepts of vector algebra. Topics include finite dimensional vector spaces and their geometric significance; representing and solving systems of linear equations using multiple methods, including Gaussian elimination and matrix inversion; matrices; determinants; linear transformations; quadratic forms; eigenvalues and eigenvector; and applications in science and engineering. Prerequisite: MATH 2414 with grade of "C" or better.

Course Requirements

Technology: A scientific calculator is needed for this course. Either a TI30XIIS or a TI84 plus are recommended. You will need access to the internet to use MyMathLab. If you do not have a computer and/or dependable internet access, contact your professor immediately so that you can discuss any options that may be available to you either through the college or the community.
Homework Assignments on MyMathLab: There is a homework assignment for each unit covered. These are listed on the course outline in the syllabus and on the list of assignments on MyMathLab. Each day's homework assignments must be completed by 11:59 pm on the due date shown on both the course outline and on the list of assignments on MyMathLab. You should do the assignments as soon as possible after participating in the lecture, reading the appropriate section in the textbook, and watching the associated video(s) on MyMathLab. Although the homework is online at mymathlab.com, and the answers are entered online, you should write your work on paper, neatly showing all steps, and keep it in your notebook with your notes for future reference, both as an aid for preparing for quizzes and exams, and as a place to begin when seeking assistance from your peers, your professor, or the college tutoring center. The student has a limit of three attempts to

answer a question correctly on the homework assignments. Quizzes on MyMathLab: Four quizzes which relate to the student learning outcomes, will be taken on MyMathLab. Like the homework assignments, the due dates are shown on both the course outline in this syllabus and on the assignment list on MyMathLab.
Quizzes: the quizzes must be taken in one sitting, they are timed, and the student gets only one attempt to answer each question. The quizzes may be retaken one time. The higher of the two grades will be used to determine the student's quiz average. Chapter Exams: There are four exams which cover the chapters in the textbook. The exams are taken in class on the due dates shown on the course outline in the syllabus. The student has one hour and twenty minutes to take each exam. Exams may not be retaken. However, if the grade on the final exam is higher than the lowest chapter exam grade, the final exam grade will replace the lowest chapter exam grade.
Comprehensive Final Exam: The final exam is taken in class on the due date shown on the course outline in the syllabus. The student has one hour and twenty minutes to take the final exam. A missed final exam may not be retaken.

Determination of Course Grade/Detailed Grading Formula
The course grade will be determined by the following formula:
10% Homework Average + 10% Quiz Average + 60% Exam Average + 20% Final Exam
A: 90 – 100
B: 80 – 90
C: 70 – 80
D: 60 – 70
F: 0 – 60

Late Work, Make-Up, and Extra Credit Policy
Late homework and quizzes may be submitted, but there is a 20% grade penalty on late assignments. Tests must be taken at the scheduled time. Make-up tests for missed exams will only be given at the discretion of the instructor if the student notifies the instructor as soon as possible about the absence.

Communicating with Your Instructor
ALL electronic communication with the instructor must be through your COM email. Due to FERPA restrictions, faculty cannot share any information about performance in the class through other electronic means.

Student Learning Outcomes
1. Identify homogeneous equations, homogeneous equations with constant coefficients, and exact and linear differential equations. – Communication Skills – Exams
2. Solve ordinary differential equations and systems of equations using direct integration, separation of variables, reduction of order, methods of undetermined coefficients and variation of parameters, series solutions, operator methods for finding particular solutions, and Laplace transform methods. – Empirical and Quantitative Skills – Exams
3. Determine particular solutions to differential equations with given boundary conditions or initial conditions. – Empirical and Quantitative Skills – Exams
4. Analyze real-world problems in fields such as Biology, Chemistry, Economics, Engineering, and Physics, including problems related to population dynamics, mixtures, growth and decay, heating and cooling, electronic circuits, and Newtonian mechanics. – Critical Thinking Skills – Exams

Academic Dishonesty

College of the Mainland is committed to a high standard of academic integrity. All students are responsible for honesty and independent effort. Incidents of academic and scholastic dishonesty (including cheating, plagiarism, and collusion) will be addressed in a manner not inconsistent with College Policy and the Student Handbook. Specifically, any student found to have been academically dishonest on an assignment, quiz or exam will receive a zero for that assignment, quiz or exam and he or she will be referred to the administration for further disciplinary action.

Student Concerns

If you have any questions or concerns about any aspect of this course, please contact your instructor using the contact information provided above. If, after discussing your concern with the instructor, your concern persists, please contact Leslie Richardson, Mathematics Department Chair, at lrichardson@com.edu.

Course Outline

Week 1: 1.1 Systems of Linear Equations, 1.2 Row Reduction and Echelon Forms, 1.3 Vector Equations, 1.4 The Matrix Equation Ax=b, 1.5 Solution Sets of Linear Systems, 1.7 Linear Independence

Week 2: 1.8 Introduction to Linear Transforms, 1.9 The Matrix of a Linear Transform, 2.1 Matrix Operations, 2.2 The Inverse of a Matrix, 2.3 Characterizations of Invertible Matrices, 2.4 Partitioned Matrices

Week 3: 2.5 Matrix Factorizations, 2.8 Subspaces of Rn, 2.9 Dimension and Rank, 3.1 Introduction to Determinants, 3.2 Properties of Determinants

Week 4: 3.3 Cramer's Rule, Volume, and Linear Transformations, 4.1 Vector Spaces and Subspaces, 4.2 Null Spaces, Column Spaces, Row Spaces, and Linear Transformations, 4.3 Linearly Independent Sets; Bases

Week 5: 4.4 Coordinate Systems, 4.5 The Dimension of a Vector Space, 4.6 Change of Basis, 5.1 Eigenvectors and Eigenvalues

Week 6: 5.2 The Characteristic Equation, 5.3 Diagonalization, 5.4 Eigenvectors and Linear Transformations, 6.1 Inner Product, Length, and Orthogonality

Week 7: 6.2 Orthogonal Sets, 6.3 Orthogonal Projections, 6.4 The Gram-Schmidt Process, 6.5 Least-Squares Problems

Week 8: 7.1 Diagonalization of Symmetric Matrices, 7.2 Quadratic Forms, 7.4 The Singular Value Decomposition

The due dates for all homework and quizzes are listed in MyLab Math.

Institutional Policies and Guidelines

Grade Appeal Process

Concerns about the accuracy of grades should first be discussed with the instructor. A request for a change of grade is a formal request and must be made within six months of the grade assignment. Directions for filing an appeal can be found in the student handbook: **https://www.com.edu/student-services/docs/Student_Handbook_2024-2025_v2.pdf.**

An appeal will not be considered because of general dissatisfaction with a grade, penalty, or outcome of a course. Disagreement with the instructor's professional judgment of the quality of the student's work and performance is also not an admissible basis for a grade appeal.

Academic Success and Support Services
College of the Mainland is committed to providing students with the necessary support and tools for success in their college careers. Support is offered through our Tutoring Services, Library, Counseling, and through Student Services. Please discuss any concerns with your faculty or an advisor.

ADA Statement
Any student with a documented disability needing academic accommodations is requested to contact:
Kimberly Lachney, Student Accessibility Services Coordinator
Phone: 409-933-8919
Email: AccessibilityServices@com.edu
Location: COM Doyle Family Administration Building, Student Success Center

Textbook Purchasing Statement
A student attending College of the Mainland is not under any obligation to purchase a textbook from the college-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

Withdrawal Policy
Students may withdraw from this course for any reason prior to the last eligible day for a "W" grade. Before withdrawing students should speak with the instructor and consult an advisor. Students are permitted to withdraw only six times during their college career by state law. The last date to withdraw from the 1st 8-week session is February 26. The last date to withdraw from the 16-week session is April 21. The last date to withdraw for the 2nd 8-week session is April 30.

FN Grading
The FN grade is issued in cases of *failure due to a lack of attendance*, as determined by the instructor. The FN grade may be issued for cases in which the student ceases or fails to attend class, submit assignments, or participate in required capacities, and for which the student has failed to withdraw. The issuing of the FN grade is at the discretion of the instructor. The last date of attendance should be documented for submission of an FN grade.

Early Alert Program
The Student Success Center at College of the Mainland has implemented an Early Alert Program because student success and retention are very important to us. I have been asked to refer students to the program throughout the semester if they are having difficulty completing assignments or have poor attendance. If you are referred to the Early Alert Program you will be contacted by someone in the Student Success Center who will schedule a meeting with you to see what assistance they can offer to help you achieve your academic goals.

Resources to Help with Stress
If you are experiencing stress or anxiety about your daily living needs including food, housing or just feel you could benefit from free resources to help you through a difficult time, please click here https://www.com.edu/community-resource-center/. College of the Mainland has partnered with free community resources to help you stay on track with your schoolwork, by addressing life issues that get in the way of doing your best in school. All services are private and confidential. You may also contact the Dean of Students office at:
deanofstudents@com.edu or communityresources@com.edu.

Nondiscrimination Statement
The College District prohibits discrimination, including harassment, against any individual on the basis of race, color, religion, national origin, age, veteran status, disability, sex, sexual orientation, gender (including gender identity and gender expression), or any other basis prohibited by law. Retaliation against anyone involved in the complaint process is a violation of College District policy.