College of the Mainland

Department of Mathematics

# Syllabus
### for
## Math 2318.101CL Spring 2022
## Linear Algebra
## TTh 11:00 AM – 12:20 PM in STEAM 105

**Professor:** **Tom English**
**E-mail:** **tenglish@com.edu**

**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 hours**
**Office Hours**: MW 8:00 AM - 9:20 AM, TTh 10:00 AM – 10:50 AM, F 8:00 AM – 9:50 AM, 11:00 AM – 11:30 AM.

1. **Required Textbook**
   The textbook used in this course is: Linear Algebra and its Applications, sixth edition, by Lay, Lay, McDonald.  Pearson Publishing Company.  Note: you will have access to the text online via MyMathLab.  You do not have to purchase a printed copy of the text.

2. **Textbook Purchase**
   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.

3. **Course Description**
   College Algebra is an in-depth study and applications of polynomial, rational, radical, exponential and logarithmic functions, and systems of equations using matrices.

4.  **Technology**
    A calculator is needed for this course. A Texas Instruments TI 83 Plus or TI 84 Plus is recommended. A TI 89 or higher cannot be used in this course.

5.  **Course Requirements**

    **Homework Assignments**
    There is an assigned homework for each section. The homework will be selected daily with student input.

    **Quizzes and Exams**
    There are daily quizzes on each homework assignment and the quizzes will be the basis for the course grade.

6.  **Determination of Course Grade**

    **Grading Formula:**

    The course grade will be determined by the following formula:

    **Final Average = Quiz Average**

    **Grading Scale:**

    Grade A: Final Average in [89.5, 100]
    Grade B: Final Average in [79.5, 89.5)
    Grade C: Final Average in [69.5, 79.5)
    Grade D: Final Average in [59.5, 69.5)
    Grade F: Final Average in  [0, 59.5)

7.  **Make-up policy**
    There are no make-up quizzes. I will drop the lowest quiz score to accommodate an absence.

## 8. Course Outline

| Section | Topic | Due Date |
|---|---|---|
| 1.1 | Systems of Linear Equations | 01-20-22 |
| 1.2 | Row Reduction and Echelon Forms | 01-20-22 |
| 1.3 | Vector Equations | 01-20-22 |
| 1.4 | The Matrix Equation Ax=b | 01-25-22 |
| 1.5 | Solution Sets of Linear Systems | 01-25-22 |
| 1.7 | Linear Independence | 01-25-22 |
| 1.8 | Introduction to Linear Transforms | 01-27-22 |
| 1.9 | The Matrix of a Linear Transform | 01-27-22 |
| 2.1 | Matrix Operations | 02-01-22 |
| 2.2 | The Inverse of a Matrix | 02-01-22 |
| 2.3 | Characterizations of Invertible Matrices | 02-03-22 |
| 2.4 | Partitioned Matrices | 02-08-22 |
| 2.5 | Matrix Factorizations | 02-10-22 |
| 2.8 | Subspaces of R^n | 02-15-22 |
| 2.9 | Dimension and Rank | 02-17-22 |
| 3.1 | Introduction to Determinants | 02-22-22 |
| 3.2 | Properties of Determinants | 02-24-22 |
| 3.3 | Cramer's Rule, Volume, and Linear Transformations | 03-01-22 |
| 4.1 | Vector Spaces and Subspaces | 03-03-22 |
| 4.2 | Null Spaces, Column Spaces, Row Spaces, and Linear Transformations | 03-08-22 |
| 4.3 | Linearly Independent Sets; Bases | 03-10-22 |
| 4.4 | Coordinate Systems | 03-22-22 |
| 4.5 | The Dimension of a Vector Space | 03-24-22 |
| 4.6 | Change of Basis | 03-29-22 |
| 5.1 | Eigenvectors and Eigenvalues | 03-31-22 |
| 5.2 | The Characteristic Equation | 04-05-22 |
| 5.3 | Diagonalization | 04-07-22 |
| 5.4 | Eigenvectors and Linear Transformations | 04-12-22 |
| 6.1 | Inner Product, Length, and Orthogonality | 04-14-22 |
| 6.2 | Orthogonal Sets | 04-19-22 |
| 6.3 | Orthogonal Projections | 04-21-22 |
| 6.4 | The Gram- Schmidt Process | 04-26-22 |
| 6.5 | Least-Squares Problems | 05-03-22 |
| 7.1 | Diagonalization of Symmetric Matrices | 05-05-22 |
| 7.2 | Quadratic Forms | 05-10-22 |
| 7.4 | The Singular Value Decomposition | 05-12-22 |

**\*\*\*\* W-day: April 25 \*\*\*\***

## 9. Attendance Policy
**You are expected to attend each class.**

## 10. 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 only permitted to withdraw six times during their college career by State law. The last day to withdraw is April 25th.

11. **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.

12. **Early Alert Program**
    The Student Success Center at College of the Mainland has implemented an Early Alert Program because student success is 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 in order for you to meet your academic goals.

13. **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 dealt with in a manner that is consistent with College Policy and the Student Handbook. 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 Office of Student Conduct for further disciplinary action. Please read the sections on *Standards of Student Conduct and Discipline and Penalties* in the on-line Student Handbook.

14. **Concerns about the Instructor**
    If you have any questions or concerns about any aspect of this course, please contact me at tenglish@com.edu.   If, after discussing your concern with me, you continue to have questions, please contact Department Chair Leslie Richardson at lrichardson@com.edu

## 15. Table Mapping SLO's and Core Objectives

| Student Learner Outcomes | Maps to Core Objective | Assessed via this assignment |
|---|---|---|
| 1. Be able to solve systems of linear equations using multiple methods, including Gaussian elimination and matrix inversion. | Empirical and Quantitative Skills (EQS) | Quiz |
| 2. Be able to carry out matrix operations, including inverses and determinants. | Empirical and Quantitative Skills (EQS) | Quiz |
| 3. Demonstrate understanding of the concepts of vector space and subspace. | Critical Thinking Skills (CT) | Quiz |
| 4. Demonstrate understanding of linear independence, span, and basis. | Visual Communication Skills (CS) | Quiz |
| 5. Be able to determine eigenvalues and eigenvectors and solve problems involving eigenvalues. | Critical Thinking Skills (CT) | Quiz |
| 6. Apply principles of matrix algebra to linear transformations. | Critical Thinking Skills (CT) | Quiz |
| 7. Demonstrate application of inner products and associated norms. | Critical Thinking Skills (CT) | Quiz |

## 16. 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://build.com.edu/uploads/sitecontent/files/student-services/Student_Handbook_2019-2020v5.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.* https://build.com.edu/uploads/sitecontent/files/student-services/Student_Handbook_2019-2020v5.pdf

## 17. Academic Success & Support Services

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

18. **ADA Statement**
    Any student with a documented disability needing academic accommodations is requested to contact Holly Bankston at 409-933-8520 or hbankston@com.edu. The Office of Services for Students with Disabilities is located in the Student Success Center.

19. **Counseling Statement:** Any student that is needing counseling services is requested to please contact Holly Bankston in the student success center at 409-933-8520 or hbankston@com.edu. Counseling services are available on campus in the student center for free and students can also email counseling@com.edu to setup their appointment. Appointments are strongly encouraged; however some concerns may be addressed on a walk-in basis.

20. **COVID-19 Statement:** All students, faculty, and staff are expected to familiarize themselves with materials and information contained on the College of the Mainland's Coronavirus Information site at www.com.edu/coronavirus. In compliance with Governor Abbott's May 18 Executive Order, face coverings/masks will no longer be required on COM campus. Protocols and college signage are being updated. We will no longer enforce any COM protocol that requires face coverings. We continue to encourage all members of the COM community to distance when possible, use hygiene measures, and get vaccinated to protect against COVID-19. Please visit com.edu/coronavirus for future updates.