MTH 3306: Linear Algebra

Sul Ross State University
Fall 2025

Instructor/Professor: Mohammad Shah Alam, Ph.D.
E-mail: msa24gn@sulross.edu
shahalam.mju@gmail.com
Cell Phone: (832) 877-3205

Course Description MTH 3306 Linear Algebra is intended as an introduction to systems of linear equations, matrices, determinants, vector spaces, linear transformations, eigenvalues and eigenvectors, applications, and numerical methods.

TEKS Information on the Texas Essential Knowledge and Skills can be found on the TEA website: http://www.tea.state.tx.us

Marketable Skills (1) Logical and analytical skills. (2) Problem-solving using analytic and algebraic methods. (3) Use of technology in problem-solving and presentation. (4) Communication and pedagogical skills.

Class Meetings Asynchronous Online

Required Text David C.Lay, Linear Algebra and Its Applications

Office Hours Monday-Thursday: 8:00 am - 10:30 am; or by appointment.

Course Policies

Communication

I will post course documents, reminders, announcements, and assignments on the Blackboard system. You will also submit homework on Blackboard. I may also occasionally send announcements via e-mail. You should make sure you know how to access and use these tools. You are welcome to e-mail, telephone, or text me. However, if you choose to contact me, please make sure to state your name at the beginning of any message. I am here to help you!, If you don't communicate with me, then I can't help you.

Grading Policy

Your grades will be weighted as follows:

Homework	20%
Midterm Exam	30%
Final Exam	40%

A student who averages at least 90% will receive an A; at least 80% will receive at least a B; at least 70% will receive at least a C; at least 60% will receive at least a D.

Homework

Homework will be assigned for each section covered in the textbook. Completing each assignment before the next class is essential for meaningful participation and overall success. If you encounter difficulties, be sure to ask questions; mastery of the homework material is necessary for exam readiness. As a guideline, you should expect to spend approximately 9 hours per week on coursework outside of class. Homework will be discussed regularly in class. Please come prepared with your textbook and appropriate writing materials.

Exams

There will be one midterm exam. Its tentative date is October 11. This is subject to change. You will be notified of a change at least one week in advance. Make-up exams will be given only in the event of an emergency, in which case written justification and/or documentation must be provided and approved. The comprehensive final exam will take place at the time scheduled by the university, during the final exam period at the end of the semester. Official time and date to be announced once the university publishes the final exam schedule.

Subject Outline

Below is a tentative subject outline and schedule for this course. Next to each topic section is the corresponding section from the textbook

I.	Systems of Equations: the geometry of systems of linear equations, algebraic procedures, Gaussian elimination, reduced row-echelon form, rank and homogeneous systems and application
II.	Matrices: addition and scalar multiplication, multiplication of matrices, properties of matrix multiplication, the transpose, the identity, finding the inverse of a matrix, elementary matrices, more on inverses
III.	Determinants: cofactors and 2 × 2 determinants, the determinant of a triangular matrix, properties of determinants, finding determinants using row operations, the determinant of an inverse, Cramer's Rule, polynomial interpolation

IV.	Linear Algebra in $\mathbb{R}^n$: vectors in $\mathbb{R}^n$, the geometry of vector arithmetic, parametric lines, the dot product, planes in $\mathbb{R}^n$: the cross product, spanning, linear independence, and basis, orthogonality and the Gram Schmidt process.
V.	Linear Transformations: linear transformations and matrices, properties of linear Transformations, special linear transformations in $\mathbb{R}^2$: one-to-one and onto transformations, isomorphisms, kernel and image, the matrix of a linear transformation, the general solution of a system.
VI.	Eigenvalues and Eigenvectors: basic concepts, finding eigenvalues and eigenvectors, diagonalization.
VI.	Vector Spaces: basic definition, spanning sets, linear independence, subspaces and basis – sums and intersections, linear transformations, isomorphisms, kernel and image, matrices

QEP Mapped Course

Course Design: Communication Infused

To be successful in college and beyond, many sources (e.g., Morrealle & Pearson, 2008) indicate that communication competencies are essential. Sul Ross recognizes that the current generation of undergraduate university students should receive training to navigate a global world as competent communicators in various contexts and channels of communication.

Through our Quality Enhancement Plan (QEP) called Compass, Sul Ross aims to equip you to navigate excellence in the 21st century by developing your communication skills across multiple courses. This mathematics course is designed to enhance your communication skills. Therefore, this course has the following QEP Student Learning Outcome:

QEP Student Learning Outcome

The student will create works that exhibit skill in prepared and purposeful communication (written, oral, or visual).

University Statements

Distance Education Statement: *Students enrolled in distance education courses have equal access to the university's academic support services, such as library resources, online databases, and instructional technology support. For more information about accessing these resources, visit the SRSU website. Students should correspond using Sul Ross email accounts and submit online assignments through Blackboard, which requires secure login. Students enrolled in distance education courses at Sul Ross are expected to adhere to all policies pertaining to academic honesty and appropriate student conduct, as described in the student handbook. Students in web-based courses must maintain appropriate equipment and software, according to the needs and requirements of the course, as outlined on the SRSU website. Directions for filing a student complaint are located in the student handbook.*

SRSU Disabilities Services: *Sul Ross State University (SRSU) is committed to equal access in compliance with Americans with Disabilities Act of 1973. It is SRSU policy to provide reasonable accommodations to students with documented disabilities. It is the student's responsibility to initiate a request each semester for each class. RGC students seeking accessibility services should contact Paulette Harris, Executive Assistant to the Vice President and Dean, at 830-279-3023 or email pharris@sulross.edu. Ms. Harris's office is at 2623 Garner Field Road, Uvalde, TX 78801 (this is the mailing address, too).*

University Libraries: *The Sul Ross Library offers FREE resources and services to the entire SRSU community. Access and borrow books, articles, and more by visiting the library's website, library.sulross.edu. SRSU RGC students may request InterLibrary Loans (ILLs) and book check outs from the Sul Ross Library to be picked up at the SWTJC library that is most convenient. Access requires your LoboID and password. Librarians are a tremendous resource for your coursework and can be reached in person, by email (srsulibrary@sulross.edu), or phone (432-837-8123). The Southwest Texas Junior College (SWTJC) Library is also available on each campus for your physical use of the space or checking out books. Del Rio, Eagle Pass, and Uvalde students may use online resources available through SWTJC website, library.swtjc.edu These libraries serve as pickup locations for your ILL or Document Delivery or book requests; to do so, choose the appropriate pick-up location when requesting materials from the Alpine campus.*