MATH 3332-110, 10442, Linear Algebra

Spring 2023

Texas A&M University-Central Texas

COURSE DATES, MODALITY, AND LOCATION

This is a 100% online course, and uses the A&M-Central Texas Canvas Learning Management System [https://tamuct.instructure.com/].

This course starts on January 17th, 2023 and ends on May 12, 2023.

INSTRUCTOR AND CONTACT INFORMATION

Instructor: Dr. Audrie Cruz-Sealey

Office: Virtual Office Hours By Appointment

Email: a.cruz-sealey@tamuct.edu

Office Hours

By Appointment Only

Office hours will take place in the WebEx conference room.

Student-instructor interaction

Responses to emails will take place within 24 hours, including weekends.

Emergency Warning System for Texas A&M University-Central Texas
SAFEZONE. SafeZone provides a public safety application that gives you the ability to call for help with the push of a button. It also provides Texas A&M University-Central Texas the ability to communicate emergency information quickly via push notifications, email, and text messages. All students automatically receive email and text messages via their myCT accounts.

Downloading SafeZone allows access to push notifications and enables you to connect directly for help through the app.

You can download SafeZone from the app store and use your myCT credentials to log in. If you would like more information, you can visit the SafeZone website [www.safezoneapp.com].

To register SafeZone on your phone, please follow these 3 easy steps*:*

1. Download the SafeZone App from your phone store using the link below:
   - iPhone/iPad: [https://apps.apple.com/app/safezone/id533054756]
   - Android Phone / Tablet [https://play.google.com/store/apps/details?id=com.criticalarc.safezoneapp]
2. Launch the app and enter your myCT email address (e.g. {name}@tamuct.edu)
3. Complete your profile and accept the terms of service

For updates on COVID information, please monitor the University website [https://www.tamuct.edu/covid19/]

COURSE INFORMATION

Course Overview and description

Linear Algebra is the study of the algebra of curve-free functions extended into three- or higher-dimensional space. It covers the knowledge and skills necessary to apply vectors, matrices, matrix theorems, and linear transformations and to use technology to model and solve real-life problems. It also covers properties of and proofs about vector spaces.

Topics include linear equations and their matrix-vector representation Ax=b; row reduction; linear transformations and their matrix representations (shear, dilation, rotation, reflection); matrix operations matrix inverses and invertible matrix characterizations; computing determinants; relating determinants to area and volume; and axiomatic and intuitive definitions of vector spaces and subspaces; and proving theorems about them.

Course Objective or Goal

Student Learning Outcomes

1. Solve systems of linear equations using Gaussian elimination.
2. Perform basic operations with matrices.
3. Determine the inverse of a non-singular matrix and use it to solve a system expressed as Ax = b.
4. Compute the norm of a vector.
5. Apply determinants to area and volume.
6. Determine if a set of vectors is linearly independent.
7. View a linear transformation as a matrix multiplication.
8. Determine if a subset of vectors is a subspace.
9. Define dimensions and rank of a matrix.
10. Determine eigenvalues and eigenvectors.
11. Read and write basic proofs

Required Reading and Textbook(s)

Linear Algebra and Its Applications (6^{th} Edition) by Lay

MyMathLab Access Code

COURSE REQUIREMENTS

Grading Criteria Rubric and Conversion

Category	Weight (%)	Points
Homework (MyMathLab)	20%	200 points
Quizzes (MyMathLab)	20%	6 Quizzes – 200 points
Labs	10%	5 labs @ 20 pts each
Exam I (MyMathLab)	15%	150 points
Exam II (MyMathLab)	15%	150 points
Final Exam (MyMathLab)	20%	200 points
Total	100%	1000 points

Posting of Grades

- **MyMathLab Homework and Quizzes will be auto graded.**
- **Exams and labs will be graded and returned to the student no later than one week after the due date.**

Grading Policies

MyMathLab Homework & Quizzes—One extension is permitted for the entire course. The homework and quiz for one chapter will be extended for one week past the original due date.

Exams—Make up exams can only be taken after documentation of an emergent situation is submitted to the instructor.

Exams will be proctored using Proctorio. You will need to have a webcam and audio set up in order for your test to be proctored.

Labs—Labs will **NOT** be accepted after the due date.

Labs will be proctored using Proctorio. You will need to have a webcam and audio set up in order for your lab to be proctored.

COURSE OUTLINE AND CALENDAR

Complete Course Calendar

Week	Topic	Complete
Week #1 01/16 – 01/22	Intro to Course Systems of Linear Equations & Row Reduction and Echelon Forms Vector Equations & The Matrix Equation Ax = b	**MyMathLab** · Section 1.1 · Section 1.2 **MyMathLab** · Section 1.3
Week #2 01/23 – 01/29	Solution Sets & Applications of Linear Systems Linear Independence	· Section 1.4 · Section 1.5 · Section 1.6 **MyMathLab**
Week #3 01/30 – 02/05	Introduction and the Matrix of Linear Transformations Linear Models in Business, Science, and Engineering	· Section 1.7 · Section 1.8 · Section 1.9 **MyMathLab** · Section 1.10 · Chapter 1 Quiz **Lab #1—**MyMathLab
Week #4 02/06 – 02/12		**Due Date: Chapter 1 Material & Lab #1 Due February 12th, 2023.**
Week #5 02/13 – 02/19	Matrix Operations & The Inverse of a Matrix Characteristics of Invertible Matrices Partitioned Matrices Applications to Computer Graphics	**MyMathLab** · Section 2.1 · Section 2.2 **MyMathLab** · Section 2.3 · Section 2.4 **MyMathLab** · Section 2.7 · Chapter 2 Quiz **Lab #2—**MyMathLab
Week #6 02/20 – 02/26		**Due Date: Chapter 2 Material & Lab #2 Due February 26th, 2023.**
	Introduction & Properties of Determinants	**MyMathLab** · Section 3.1 · Section 3.2

		MyMathLab · Section 3.3 · Chapter 3 Quiz
Week #7 02/27 – 03/05	Cramer's Rule, Volume, and Linear Transformation	**Due Date: Chapter 3 Material Due March 5th, 2023.**
	Unit #1 Exam	**Opens: 03/06/23** **Closes: 03/12/23**
	Subspaces of R^n & Dimensions and Rank	**MyMathLab**
Week #8 03/06 – 03/12	Eigenvectors and Eigenvalues	· Section 2.8 · Section 2.9 · Section 5.1
	The Characteristic Equations	· Section 5.2
SPRING BREAK MARCH 13TH – MARCH 19TH		
	Diagonalization	**MyMathLab**
Week #9 03/20 – 03/26	Eigenvectors and Linear Transformations	· Section 5.3 · Section 5.4
	Complex Eigenvalues	· Section 5.5
		MyMathLab · Section 5.7 · Chapter 5 Quiz
Week #10 03/27 – 04/02	Applications of Differential Equations	**Lab #3—**MyMathLab **Due Date: Section 2.8, 2.9, and Chapter 5 Material & Lab #3 Due April 2nd, 2023.**
	Inner Product, Length and Orthogonality	**MyMathLab**
Week #11 04/03 – 04/09	Orthogonal Sets & Projections	· Section 6.1 · Section 6.2 · Section 6.3
		MyMathLab · Section 6.5 · Section 6.7
	Least-Squares Problems	· Chapter 6 Quiz
Week #12 04/10 – 04/16	Inner Product Spaces & Applications	**Lab #4—**MyMathLab **Due Date: Chapter 6 Material & Lab #4 Due April 16th, 2023.**
	Unit #2 Exam	**Open: 04/17/23** **Closes: 04/23/23**
Week #13 04/17 – 04/23	Diagonalization of Symmetric Matrices	**MyMathLab** · Section 7.1

	Quadratic Forms	· Section 7.2
Week #14	Constrained Optimization	**MyMathLab**
04/24 – 04/30		· Section 7.3
	The Singular Value Decomposition	· Section 7.4 **MyMathLab**
		· Section 7.5
		· Chapter 7 Quiz
		Lab #5—In MyMathLab
Week #15	Applications to Image Processing and Statistics	
05/01 – 05/07		**Due Date: Chapter 7 Material & Lab #5 Due May 7th, 2023.**
		Last Week for any Make-Up Work!!!
Week # 16	Final Exam Review	
05/08 – 05/14		**Opens: 05/08/23**
	Final Exam	**Closes/Due: 05/14/23**

Important University Dates

Please find university event dates: *https://www.tamuct.edu/registrar/academic-calendar.html*

TECHNOLOGY REQUIREMENTS AND SUPPORT

Technology Requirements

This course will use the A&M-Central Texas Instructure Canvas learning management system. **We strongly recommend the latest versions of Chrome or Firefox browsers. Canvas no longer supports any version of Internet Explorer.**

Logon to A&M-Central Texas Canvas [https://tamuct.instructure.com/] or access Canvas through the TAMUCT Online link in myCT [https://tamuct.onecampus.com/]. You will log in through our Microsoft portal.

Username: Your MyCT email address. Password: Your MyCT password

Canvas Support

Use the Canvas Help link, located at the bottom of the left-hand menu, for issues with Canvas. You can select "Chat with Canvas Support," submit a support request through "Report a Problem," or call the Canvas support line: 1-844-757-0953.

For issues related to course content and requirements, contact your instructor.

Online Proctored Testing

A&M-Central Texas uses Proctorio for online identity verification and proctored testing. This service is provided at no direct cost to students. If the course requires identity verification or proctored testing, the technology requirements are: Any computer meeting the minimum computing requirements, plus web camera, speaker, and microphone (or headset). Proctorio also requires the Chrome web browser with their custom plug in.

Other Technology Support

For log-in problems, students should contact Help Desk Central, 24 hours a day, 7 days a week

Email: helpdesk@tamu.edu

Phone: (254) 519-5466

Web Chat: [http://hdc.tamu.edu]

Please let the support technician know you are an A&M-Central Texas student.

UNIVERSITY RESOURCES, PROCEDURES, AND GUIDELINES

Academic Accommodations

At Texas A&M University-Central Texas, we value an inclusive learning environment where every student has an equal chance to succeed and has the right to a barrier-free education. The Warrior Center for Student Success, Equity and Inclusion is responsible for ensuring that students with a disability receive equal access to the university's programs, services and activities. If you believe you have a disability requiring reasonable accommodations, please contact the Office of Access and Inclusion, WH-212; or call (254) 501-5836. Any information you provide is private and confidential and will be treated as such.

For more information, please visit our Access & Inclusion Canvas page (log-in required) [https://tamuct.instructure.com/courses/717]

Academic Integrity

Texas A&M University-Central Texas values the integrity of the academic enterprise and strives for the highest standards of academic conduct. A&M-Central Texas expects its students, faculty, and staff to support the adherence to high standards of personal and scholarly conduct to preserve the honor and integrity of the creative community. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. All academic misconduct concerns will be referred to the Office of Student Conduct. When in doubt on collaboration, citation, or any issue, please contact your instructor before taking a course of action.

For more information regarding the student conduct process, [https://www.tamuct.edu/student-affairs/student-conduct.html].

If you know of potential honor violations by other students, you may submit a referral, [https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0].

Drop Policy

If you discover that you need to drop this class, you must complete the Drop Request Dynamic Form through Warrior Web.

[https://federation.ngwebsolutions.com/sp/startSSO.ping?PartnerIdpId=https://eis-prod.ec.tamuct.edu:443/samlsso&SpSessionAuthnAdapterId=tamuctDF&TargetResource=https%3a%2f%2fdynamicforms.ngwebsolutions.com%2fSubmit%2fStart%2f53b0502-4f36-be43-f02a4202f612].

Faculty cannot drop students; this is always the responsibility of the student. The Registrar's Office will provide a deadline on the Academic Calendar for which the form must be completed. Once you submit the completed form to the Registrar's Office, you must go into Warrior Web and confirm that you are no longer enrolled. If you still show as enrolled, FOLLOW-UP with the Registrar's Office immediately. You are to attend class until the procedure is complete to avoid penalty for absence. Should you miss the drop deadline or fail to follow the procedure, you will receive an F in the course, which may affect your financial aid and/or VA educational benefits.

Important information for Pregnant and/or Parenting Students

Texas A&M University-Central Texas supports students who are pregnant, experiencing pregnancy-related conditions, and/or parenting. In accordance with requirements of Title IX and related guidance from US Department of Education's Office of Civil Rights, the Dean of Student Affairs' Office can assist students who are pregnant and/or parenting in seeking accommodations related to pregnancy and/or parenting. Students should seek out assistance as early in the pregnancy as possible. For more information, please visit Student Affairs [https://www.tamuct.edu/student-affairs/pregnant-and-parenting-students.html]. Students may also contact the institution's Title IX Coordinator. If you would like to read more about these requirements and guidelines online, please visit the website [http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf].

Title IX of the Education Amendments Act of 1972 prohibits discrimination on the basis of sex and gender–including pregnancy, parenting, and all related conditions. A&M-Central Texas is able to provide flexible and individualized reasonable accommodation to pregnant and parenting students. All pregnant and parenting students should contact the Associate Dean in the Division of Student Affairs at (254) 501-5909 to seek out assistance. Students may also contact the University's Title IX Coordinator.

Tutoring

Tutoring is available to all A&M-Central Texas students, both virtually and in-person. Student success coaching is available online upon request.

If you have a question, are interested in becoming a tutor, or in need of success coaching contact the Warrior Center for Student Success, Equity and Inclusion at (254) 501-5836, visit the Warrior Center at 212 Warrior Hall, or by emailing WarriorCenter@tamuct.edu.

To schedule tutoring sessions and view tutor availability, please visit Tutor Matching Services [https://tutormatchingservice.com/TAMUCT] or visit the Tutoring Center in 111 Warrior Hall.

Chat live with a remote tutor 24/7 for almost any subject from on your computer! Tutor.com is an online tutoring platform that enables A&M-Central Texas students to log in and receive online tutoring support at no additional cost. This tool provides tutoring in over 40 subject areas except writing support. Access Tutor.com through Canvas.

University Library & Archives

The University Library & Archives provides many services in support of research across campus and at a distance. We offer over 350 electronic databases containing approximately 631,525 eBooks and 75,149 journals, in addition to the 97,443 items in our print collection, which can be mailed to students who live more than 50 miles from campus. Research guides for each subject taught at A&M-Central Texas are available through our website to help students navigate these resources. On campus, the library offers technology including cameras, laptops, microphones, webcams, and digital sound recorders.

Research assistance from a librarian is also available 24 hours a day through our online chat service, and at the reference desk when the library is open. Research sessions can be scheduled for more comprehensive assistance, and may take place virtually through WebEx, Microsoft Teams or in-person at the library. Schedule an appointment here

[https://tamuct.libcal.com/appointments]. Assistance may cover many topics, including how to find articles in peer-reviewed journals, how to cite resources, and how to piece together research for written assignments.

Our 27,000-square-foot facility on the A&M-Central Texas main campus includes student lounges, private study rooms, group work spaces, computer labs, family areas suitable for all ages, and many other features. Services such as interlibrary loan, TexShare, binding, and laminating are available. The library frequently offers workshops, tours, readings, and other events. For more information, please visit our Library website

[https://tamuct.libguides.com/index]

University Writing Center

University Writing Center: Located in Warrior Hall 416, the University Writing Center (UWC) at Texas A&M University–Central Texas (A&M–Central Texas) is a free service open to all A&M–Central Texas students. The hours of operation are from 10:00 a.m.-5:00 p.m. Monday thru Thursday in Warrior Hall 416 (with online tutoring available every hour as well) with satellite hours available online only Monday thru Thursday from 6:00-9:00 p.m. and Saturday 12:00-3:00 p.m.

Tutors are prepared to help writers of all levels and abilities at any stage of the writing process. While tutors will not write, edit, or grade papers, they will assist students in developing more effective composing practices. By providing a practice audience for students' ideas and writing, our tutors highlight the ways in which they read and interpret students' texts, offering guidance and support throughout the various stages of the writing process. In addition, students may work independently in the UWC by checking out a laptop that runs the Microsoft Office suite and connects to WIFI, or by consulting our resources on writing, including all of the relevant style guides. Whether you need help brainstorming ideas, organizing an essay, proofreading, understanding proper citation practices, or just want a quiet place to work, the UWC is here to help!

Students may arrange a one-to-one session with a trained and experienced writing tutor by making an appointment via WCOnline [https://tamuct.mywconline.com/]. In addition, you can email Dr. Bruce Bowles Jr. at bruce.bowles@tamuct.edu if you have any questions about the UWC, need any assistance with scheduling, or would like to schedule a recurring appointment with your favorite tutor.

OTHER POLICY STATEMENTS

A Note about Sexual Violence at A&M-Central Texas

Sexual violence is a serious safety, social justice, and public health issue. The university offers support for anyone struggling with these issues. University faculty are mandated reporters, so if someone discloses that they were sexually assaulted (or a victim of Domestic/Dating Violence or Stalking) while a student at TAMUCT, faculty members are required to inform the Title IX Office. If you want to discuss any of these issues confidentially, you can do so through Student Wellness and Counseling (254-501-5955) located on the second floor of Warrior Hall (207L).

Sexual violence can occur on our campus because predators often feel emboldened, and victims often feel silenced or shamed. It is incumbent on ALL of us to find ways to actively create environments that tell predators we don't agree with their behaviors and tell survivors we will support them. Your actions matter. Don't be a bystander; be an agent of change. For additional information on campus policy and resources visit the Title IX webpage [https://www.tamuct.edu/compliance/titleix.html].

Behavioral Intervention

Texas A&M University-Central Texas cares about the safety, health, and well-being of its students, faculty, staff, and community. If you are aware of individuals for whom you have a concern, please make a referral to the Behavioral Intervention Team. Referring your concern shows you care. You can complete the referral online

[https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=2].

Anonymous referrals are accepted. Please see the Behavioral Intervention Team website for more information [https://www.tamuct.edu/bit]. If a person's behavior poses an imminent threat to you or another, contact 911 or A&M-Central Texas University Police at 254-501-5805.

INSTRUCTOR POLICIES

Homework and Quizzes: may be accessed after due date with a 30% deduction. The final day to access homework and quizzes is Sunday of Week 15.

Exams: In order to make up an exam, documentation must be provided by a physician or the professor will decide if the situation deems an extension.

Labs: Labs will **NOT** be accepted after the due date.

Copyright Notice

Students should assume that all course material is copyrighted by the respective author(s). Reproduction of course material is prohibited without consent by the author and/or course instructor. Violation of copyright is against the law and Texas A&M University-Central Texas' Code of Academic Honesty. All alleged violations will be reported to the Office of Student Conduct.