

MTHK 5350-110, CRN 10447 LINEAR ALGEBRA

Spring 2023 rev. 01.09.2023

Texas A&M University - Central Texas

COURSE DATES, MODALITY, AND LOCATION

Jan 17, 2023 - May 12, 2023

The instructional method is online, and uses the A &M-Central Texas Canvas Learning Management System [<https://tamuct.instructure.com/>].

INSTRUCTOR AND CONTACT INFORMATION

Instructors: Christopher Thron

Office: All contact is online

Phone, text, and WhatsApp: (585) 204-0314

Email: Please email instructor via Canvas email.

Google Meet (for online meetings): chris.thron@gmail.com

You may contact me at any time by email or text. Often I can respond immediately, and if necessary we can meet online to answer your question right away. WhatsApp is also OK, but I may not see it right away.

Office Hours

The instructor is generally available online from 9 A.M.-1 P.M. and from 4 P.M.-6 P.M. on weekdays and Saturday. *Students are encouraged to make appointments to discuss issues with homework (both before and after grading). Each student is entitled to an average of ½ hour of face-to-face time with the instructor (besides questions you may have with the homework).*

Student-instructor interaction

Aside from the above, the instructor will schedule two regular online sessions per week for discussion and problem-solving. Sessions will be accessed within Canvas, and will be recorded.

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](http://www.safzoneapp.com) website [www.safzoneapp.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): [<https://apps.apple.com/app/safezone/id533054756>]
 - [Android Phone / Tablet](https://play.google.com/store/apps/details?id=com.criticalarc.safzoneapp)
[<https://play.google.com/store/apps/details?id=com.criticalarc.safzoneapp>]
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

An advanced course in linear algebra. Topics to be selected from linear spaces and operators, canonical forms, quadratic forms and optimization, computation and condition, and compatible systems. Prerequisite(s): MATH 3332.

Student Learning Outcomes

After completing this course, students will have mastery of the basic techniques and concepts of Linear Algebra, including: linear systems of equations and Gaussian elimination; echelon forms; general solutions of homogeneous and inhomogeneous linear equations; matrix multiplication; inverting matrices; determinants, their properties and computation; vector spaces, subspaces, bases, and dimension; eigenvalues, eigenvectors, eigenspaces, and dimension; matrix diagonalization; linear transformation (kernel, range, and matrix representation). Students will also have experience and competency in applying linear algebra to real problems in data science and signal processing.

Required Reading and Textbook(s)

Jim Hefferon, Linear Algebra website: <https://hefferon.net/linearalgebra/>
(materials include textbook, answer manual, videos, slides)

Video playlist, <https://youtube.com/playlist?list=PL2uooHqQ6T7MQvZ1kP-NnB2rn-TA4rK5w>

Additional course materials (including class notes):

https://drive.google.com/drive/folders/1ZVo5N7VdiO-zijWUDMph-DCXAPjQyNVr?usp=share_link

Supplementary materials

Marcel Finan, Linear Algebra for Engineers:

<https://faculty.atu.edu/mfinan/LINENG.pdf>

Matrix methods in machine learning:

<https://ocw.mit.edu/courses/mathematics/18-065-matrix-methods-in-data-analysis-signal-processing-and-machine-learning-spring-2018/#>

COURSE REQUIREMENTS

- Homework (50%) will be assigned on a weekly or bi-weekly basis. Solutions will be provided. Students are expected to self-check. Selected homework questions will be graded.
- Exam 1: 20%
- Exam 2/project (30%). This may be a combination of take-home test and project, as determined by the instructor

Grading Criteria Rubric and Conversion

Homework	50% (50 points)	90- 100%= A
Exam 1	20% (20 points)	80- 89%= B
Exam 2/Project	30% (30 points)	70- 79%= C
		60- 69%= D

TOTAL 100% (100 points) Below 60 % F

Partial credit for homework and test questions will be awarded according to the following guidelines:

- 100% Perfect
- 90% Minor careless or technical mistakes
- 80% Minor procedural error
- 70% Major conceptual or procedural error.
- 40% Makes beginning steps towards a solution
- 20% Some relevant information supplied.

Posting of Grades

I will attempt to post grades on Canvas within one week of submissions. If I am late and you want to know your grade, please email me and I will respond as soon as possible. If you want feedback on your homework, I'm always happy to schedule an appointment and look through it together.

Grading Policies

Late work is only accepted with written documentation of exceptional circumstances.

Examples of exceptional circumstances include family emergency, hospitalization, funeral, etc.

Late work also receives a maximum B grade, regardless of circumstances.

If your overall grade (on a scale from 0 to 100) is within 1 point of the next highest grade level, I will increase your grade if you have done all of the quizzes. Otherwise you will be graded strictly according to the numbers. That means that if your average is 89.99 and you didn't do all the quizzes, then you still get a B.

COURSE OUTLINE AND CALENDAR

Complete Course Calendar

First day of the week (Monday)

16 Jan Chapter One (Linear systems, reduced echelon form)

23 Jan Chapter One Topics (selected applications)

30 Jan Chapter Two (Vector spaces, linear dependence, bases)

6 Feb Chapter Two Topics (selected applications)

13 Feb Chapter Three (Linear maps, homomorphisms, matrix representations)

20 Feb Chapter Three (Change of basis, projection)

27 Feb Chapter Three Topics (selected applications)

6 Mar Exam 1 (covers Chapters 1-3)

13 Mar **SPRING BREAK**

20 Mar Chapter 4 Determinants & geometrical interpretation)

27 Mar Chapter 4 topics (selected applications)

3 Apr Chapter 5 Similarity & complex vector spaces

10 April Chapter 5 Jordan normal form

17 April Chapter 5 Topics (selected applications)

24 April 2nd Test/Project TBD

1 May 2nd Test/Project TBD

8 May 2nd Test/Project TBD

Important University Dates

<https://www.tamuct.edu/registrar/academic-calendar.html>]

TECHNOLOGY REQUIREMENTS AND SUPPORT

Technology Requirements

You will need a computer that can be used for videoconferencing.

Any software used during the course will be open-source and free.

Note: The following material is generic and is included in all TAMUCT syllabi.

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): [<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](https://tamuct.instructure.com/courses/717) 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), [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), [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](https://federation.ngwebsolutions.com/sp/startSSO.ping?PartnerIdpid=https://eis-prod.ec.tamuct.edu:443/samlso&SpSessionAuthnAdapterId=tamuctDF&TargetResource=https%3a%2f%2fdynamicforms.ngwebsolutions.com%2fSubmit%2fStart%2f53b8369e-0502-4f36-be43-f02a4202f612) Dynamic Form through Warrior Web.

[https://federation.ngwebsolutions.com/sp/startSSO.ping?PartnerIdpid=https://eis-prod.ec.tamuct.edu:443/samlso&SpSessionAuthnAdapterId=tamuctDF&TargetResource=https%3a%2f%2fdynamicforms.ngwebsolutions.com%2fSubmit%2fStart%2f53b8369e-0502-4f36-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) [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](http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf) 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) [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) [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) [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 [WCOOnline](https://tamuct.mywconline.com/) [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) [<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](https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=2) online

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

Anonymous referrals are accepted. Please see the [Behavioral Intervention Team](https://www.tamuct.edu/bit) 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.