CSE 3380-002: Linear Algebra for CSE

Spring 2022

Instructor Information

Instructor(s)
Dr. Alex Dillhoff

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ERB 651

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817-272-3785

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Faculty Profile
https://mentis.uta.edu/explore/profile/alex-dillhoff

Office Hours
Office hours will be facilitated through Microsoft Teams (online only).
MoWe 3:00PM – 4:00PM **or by appointment**

Course Information

Section Information
CSE 3380-002

Time and Place of Class Meetings
MoWe 1:00PM – 2:20PM NH 108

Description of Course Content
Solving systems of equations, matrix algebra, determinants, vector spaces, orthogonality and least squares, with applications to computer science. Prerequisite: C or better in CSE 2315.

Student Learning Outcomes
This course will explore standard topics in linear algebra such as vector spaces, determinants, methods for solving systems of linear equations, eigenvalues and eigenvectors, and more. It will also cover applications of linear algebra such as computer graphics, optimization, and others as time allows.

At the end of the course you should be able to solve system of linear equations, compute eigenvalues and eigenvectors, understand determinants, apply linear transformations to data and understand the relationships between different vector spaces. Additionally, you will have some knowledge of how linear algebra is applied in many different applications.

Required Textbooks and Other Course Materials
Linear Algebra and Its Applications by David C. Lay, Steven Lay, and Judi McDonald (5e or 6e)

Descriptions of major assignments and examinations
There will be 3 exams: two during the regular session and one final exam. Regular assignments will be posted as topics are covered. Practicing by studying the assignment and other problems is essential to understanding the material.

Technology Requirements
Assignments, grades, and other announcements will be posted on Canvas. Lectures will be streamed and recorded via Teams.

Grading Information

Grading
Like almost every skill in life, understanding is gained by exploring, questioning, and testing yourself. There are many topics to cover in the semester and, as such, there will be weekly home-work assignments. The homeworks will be design to focus on each relevant topic. I encourage you to also seek out practice problems from the book and other online resources.

All assignments and exams will be submitted through Canvas. **For each day the submission is late, a letter grade penalty is applied.**

While I do encourage students to study together and share resources for learning, I expect every student to do their own work and turn in their own code. Assignments requiring code will be automatically checked for similarity with other student submissions as well as online sources. I am required to report any suspicion of academic dishonesty to the Office of Student Conduct. Any student who is found guilty of violating any part of the UTA Honor Code will receive a 0 on the assignment or exam in question. Additionally, your final grade will be dropped to the next lowest letter grade. A second violation will result in an F for the class.

Information on UTA's Honor Code can be found at https://www.uta.edu/student-affairs/community-standards/academic-integrity

Grades are weighted equally between exams and assignments.
That is, final_grade = assignment_average * 0.5 + exam_average * 0.5

Final grades are converted to letter grades based on the following:

- A: x >= 89.5%
- B: 89.5% > x >= 79.5%
- C: 79.5% > x >= 69.5%
- D: 69.5% > x >= 59.5%
- F: x < 59.5%

Grade Grievances
The TA and I are human. We make mistakes like everyone else. If you have any issues with the way something is graded, please reach out to us and let us know. In most cases, it was something that was missed and can be corrected quickly.

Course Schedule

Date	Topic	Reading
January 19, 21	Systems of linear equations	1.1, 1.2, 1.5
January 24	Vectors, Linear combinations	1.3, 1.4

January 26	Matrix operations, inverse	2.1, 2.2
January 31	Block matrices	2.4
February 2	Determinants, properties of	3.1, 3.2
February 7	Vector spaces	4.1
February 9	Subspaces	1.8, 2.8, 4.1, 4.2
February 14	Linear independence, Bases	4.3
February 16	Exam Review	
February 21	**Exam 1**	
February 23, 28	Linear transformations	1.8
February 28, March 2	Computer graphics	2.7
March 7	Determinants and Volumes, Determinants and linear transformations	3.3
March 9	Cramer's Rule, Coordinate Systems	3.3, 4.4
March 21	Dimension of a Vector Space, Rank of a matrix	4.5, 4.6
March 23	Change of Basis, Orthogonality	4.7, 6.1
March 28	Norm/Length, Sets, Projections	6.2, 6.3
March 30	Exam Review	
April 4	**Exam 2**	
April 6	Gram-Schmidt, QR factorization	6.4
April 11	Least-Squares problems, linear models	6.5, 6.6
April 13, 18	Eigenvalues and eigenvectors	5.1
April 20	Diagonalization	5.3, 7.1
April 25	Singular Value Decomposition	7.4
April 27	**Reserve**	
May 2	Final Exam Review	

Important Dates

January 18	First day of classes
February 2	Census date
March 14 – 20	**Spring Break**
April 1	**Last day to drop classes**
May 3	Last day of classes
May 5 – 11	Final Exam Week

Institutional Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

Additional Information

Recommended Face Covering
Face masks or face coverings for all employees, students, visitors, and vendors are encouraged while in campus buildings and elsewhere on campus where social distancing measures are difficult to maintain (e.g., student shuttle buses, well-attended outdoor events, etc.). Cloth face masks will also be made available to individual employees and/or students at the University Center Campus Information Desk, the Main Library, and at The Commons Information Desk.

N95 masks are more effective at filtering aerosols than surgical or cloth masks. More information can be found here: https://www.projectn95.org/

Attendance
At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance.

I do not require attendance. Attendance is usually implicitly determined by student outcomes on assignments and exams. I will typically try and reach out to those that are waning in performance to see what we can do to stay on track.

However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

Emergency Exit Procedures
Should we experience an emergency event that requires evacuation of the building, students should exit the room and move toward the nearest exit, which is located out the door and to your immediate right. When exiting the building during an emergency, do not take an elevator but use the stairwells instead. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

You can view the evacuation map for this building at the following link:

https://www.uta.edu/campus-ops/ehs/fire/Evac_Maps_All/Evac_NH/Evac_NH_108.pdf

Students should also be encouraged to subscribe to the MavAlert system that will send information in case of an emergency to their cell phones or email accounts. Anyone can subscribe at Emergency Communication System.

Academic Success Center
The Academic Success Center (ASC) includes a variety of resources and services to help you maximize your learning and succeed as a student at the University of Texas at Arlington. ASC services include supplemental instruction, peer-led team learning, tutoring, mentoring and TRIO SSS. Academic Success Center services are provided at no additional cost to UTA students. For additional information visit: Academic Success Center. To request disability accommodations for tutoring, please complete this form.

The IDEAS Center (https://www.uta.edu/ideas/) (2nd Floor of Central Library) offers FREE tutoring and mentoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.

Counseling and Psychological Services
Physical and mental wellness are an important part of learning. UTA offers counseling and psychiatry to all students enrolled in campus-based classes. For more information, go to https://www.uta.edu/caps/. This is an amazing resource to have as a student!

Emergency Phone Numbers

In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381