Math 341, Spring 2024, Unique nr. 53755

Linear algebra and matrix theory

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Course objectives. This course covers a variety of topics within linear algebra and matrix theory. It is also intended to help develop skills at constructing and writing mathematical proofs. Specific topics to be covered include vectors and matrices, systems of linear equations and Gaussian elimination, eigenvalues and eigenvectors, determinants, vector spaces, linear transformations, and orthogonality.

Course Outcomes. By the end of the course, students will be able to understand different realizations of vectors, solve systems of linear equations and interpret the solution sets in algebraic and geometric ways, find bases and dimensions of vector spaces, find distances, projections and orthogonal bases of subspaces in $\mathbb{R}^n$, compute determinants, find eigenvalues and eigenvectors of a matrix. Students will also learn to understand and write simple mathematical proofs, and apply various proof techniques.

Prerequisites. M408D, M408L, M408S, or the equivalent, with a grade of at least C-, or consent of instructor.

Website. You will find a detailed schedule, and links to slides, practice tests, and other course materials at:

`https://users.oden.utexas.edu/~pgm/Teaching/2024_M341`

Text. *Elementary Linear Algebra* by Stephen Andrilli and David Hecker, 5th edition.

Meeting times. TTh 8.00am – 9.15am, PMA 5.114.

Office hours (instructor). Mondays 1:00pm – 2:00pm; Fridays 4:00pm – 5:00pm. Via zoom.

Required devices. Students will need a computer, laptop, iPad, or tablet with internet access and scanning capability (a smartphone is fine). You will need to bring a device to class to participate in quizzes.

Homeworks. There will be 11 homework assignments. You will find a precise schedule on the course webpage.

The homeworks should be completed individually. You are allowed, and even encouraged, to discuss homework problems with each other, but the work you hand in needs to be your own.

Grading. The final grade will be based on homeworks, three section exams, a final exam, and in-class quizzes:

- 27% for homeworks, where you receive 3% each for your top 9 homeworks over the course of the semester. In other words, your two lowest scores will be dropped.
- 10% for quizzes during the course of the semester, including 2% for participating in the student course evaluation in the last week. There will be about one brief quiz per week, on random days. Anyone answering all questions will get full credit. You can miss two quizzes without losing any points.
- 15% for section exam 1 on Thursday February 22. (In class.)
- 15% for section exam 2 on Thursday March 28. (In class.)
- 10% for section exam 3 on Thursday April 18. (In class.)
- 23% for the final exam on Thursday May 2.

The homeworks should be completed individually, but you are allowed to discuss the problems with your fellow students. Homeworks will be submitted through GradeScope. The four exams will all be in person, and should be worked individually (closed books, no lecture notes, no calculators, etc.).

The purpose of the quizzes is to facilitate learning and to provide feedback to the instructor. They are also intended to encourage attendance, so there will be no mechanism for taking quizzes other than by attending the class. Since everyone may experience illness or other extenuating personal circumstances that make it impossible to attend class, you are allowed to miss two quizzes without losing any points. (If due to exceptional circumstances, you miss additional classes, then please contact the instructor to discuss options. The earlier the better.)

Concerns. If concerns of any kind arise during the course of the semester, I want to hear from you.

If you find that some aspects of the course delivery are not working well, it is more helpful for me (and you!) if you tell me early in the semester.

Make sure you are available during the exam times posted. If these conflict with any religious holidays or other foreseeable events, then please let me know at the start of the semester.

Importantly, if you fall behind, find it hard to follow along, or have any other issues arise that make it challenging for you to do well in the course, then let me know early! The later I find out, the harder it will be to help.

University policies and resources. For a list of important university policies and helpful resources that you may need as you engage with and navigate your courses and the university, see the University Policies and Resources Students Canvas page. The page includes the language of the University Honor Code, Title IX legal requirements for Texas employees, and information about how to receive support through the office of Disability & Access.

Getting help with technology. Students needing help with technology in this course should contact the ITS Service Desk: `https://its.utexas.edu/contact`

Classroom expectation.

Attendance: Expect to attend and actively participate in all class meetings. If you do have to miss class, please contact a classmate to get notes and information from the missed class. (In fact, it's a great idea to collaborate with one or more classmates throughout the semester!) Note that 10% of your overall grade comes from in-class quizzes; if you miss more than two of these, it may negatively impact your overall score on the course.

Behavior Expectations & Professional Standards: Please attend our in-person class meetings on time and be prepared to actively participate. Of course, we are all expected to uphold The University of Texas at Austin Honor Code (`https://deanofstudents.utexas.edu/conduct/standardsofconduct.php`) in all settings, all modes of communication, and all interactions with each other (class meetings, all assignment submissions, all email communications, etc.).

Artificial intelligence. The creation of artificial intelligence tools for widespread use is an exciting innovation. These tools have both appropriate and inappropriate uses in class work. In this specific class, the use of artificial intelligence tools (such as ChatGPT) is strictly prohibited. This includes using AI to generate ideas, outline an approach, answer questions, solve problems, or create original language. All work in this course must be your own or created in group work, where allowed.

Religious holy days. By UT Austin policy, you must notify me of your pending absence for a religious holy day as far in advance as possible of the date of observance. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Equitable accommodation. As specified in the grading policy, your two lowest homework scores will be dropped. Additionally, you may miss two of the in-class quizzes without losing any credit towards your grade.

Academic integrity expectations. Students who violate University rules on academic misconduct are subject to the student conduct process. A student found responsible for academic misconduct may be assigned both a status sanction and a grade impact for the course. The grade impact could range from a zero on the assignment in question up to a failing grade in the course. A status sanction can include a written warning, probation, deferred suspension or dismissal from the University. To learn more about academic integrity standards, tips for avoiding a potential academic misconduct violation, and the overall conduct process, please visit the Student Conduct and Academic Integrity website at: `http://deanofstudents.utexas.edu/conduct`

Important safety information.

Carrying of handguns on campus Students in this class should be aware of the following university policies related to Texas' Open Carry Law:

- Students in this class who hold a license to carry are asked to review the university policy regarding campus carry.
- Individuals who hold a license to carry are eligible to carry a concealed handgun on campus, including in most outdoor areas, buildings and spaces that are accessible to the public, and in classrooms.
- It is the responsibility of concealed-carry license holders to carry their handguns on or about their person at all times while on campus. Open carry is NOT permitted, meaning that a license holder may not carry a partially or wholly visible handgun on campus premises or on any university driveway, street, sidewalk or walkway, parking lot, parking garage, or other parking area.