

COURSE DESCRIPTION
LINEAR ALGEBRA
MA 434/534–OW
SUMMER 2023

DEPARTMENT OF MATHEMATICS
UNIVERSITY OF ALABAMA AT BIRMINGHAM

Course Instructor: Rudi Weikard
Office: UH 4032
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Office Hours: TT 10:30 am – 11:30 am and by appointment

Meeting times: TT 12:40 pm — 2:40 pm
Meeting location: HHB 126
Prerequisite: Grade of C or better in MA 126 or equivalent
Credits: 3 semester hours
Textbook: No textbook required. Lecture notes will be posted online.
Canvas: <https://www.uab.edu/elearning/canvas/>

Important dates:

First day of classes: June 6 (for this course)
Last day to Drop/Add: June 12
Independence Day Holiday: July 4
Last day of classes: August 3 (for this class)
Grades available online: August 16

Course content:

- Systems of linear equations
 - Euclidean vector spaces
 - General vector spaces
 - Linear transformations
 - Inner product spaces
 - Spectral theory
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Aims of the course:

The course aims for students to attain *conceptual understanding* and *procedural fluency* with regard to the basic material of Linear Algebra. *Conceptual understanding* is demonstrated by the ability to explain and develop proofs of the claims made in the lecture notes. *Procedural fluency* is demonstrated by exercising routine

Date: May 25, 2023.

tasks in an assured and timely fashion. The course also emphasizes *critical thinking* and *communication skills*, both written and verbal.

Methods of teaching and learning:

- Students study the lecture notes providing missing details outside of class. A significant time commitment (certainly more than class time) is to be expected.
- 17 class meetings of 120 minutes where students present the course material prepared in written form ahead of time.
- Working in groups is encouraged but not required.
- Students may seek outside help (books, internet, class mates) as they see fit as long as any help is acknowledged.

Assessment procedures:

- (1) There are no quizzes or tests, not even a Final Exam.
- (2) Points are earned through work on the course material, presentations of that work, and course participation as explained below.
- (3) Preparation for class:
 - (a) The material in the lecture notes is organized in topics (which are grouped in sections and chapters).
 - (b) Before class students study the topics, do the assigned tasks and exercises and prepare proofs of the theorems.
 - (c) For each topic students prepare papers. Up to four students may collaborate in the preparation of a paper.
- (4) Presentation of papers in class:
 - (a) Everybody will have the opportunity to present course material. It is best to have it written out on paper. Sometimes we might enlist the help of the document camera.
 - (b) The audience (including the instructor) may challenge a statement made in the course of the presentation at any point.
 - (c) If the presenter is able to defend the challenged statement, he or she proceeds; if not, the presenter must sit down earning no points for this problem and losing the right to present again that day. The challenger may then present his or her solution.
 - (d) A presentation will be considered correct if no one has objections (or further objections). The presenter and, if applicable, his or her collaborators (see rule (4g)) will earn a total of 20 points at this time.
 - (e) During class the instructor has the final decision whether an argument may stand or not.
 - (f) You must give credit where credit is due, i.e., during your presentation you must declare the points at which you had help and by whom.
 - (g) It is also possible to report joint work. 8 points are awarded to the presenter while the remaining points 12 are distributed equally among the authors of the paper (including the presenter). Up to four authors are allowed per paper.
 - (h) The successor of a presenter will be chosen as the student with the smallest number of points among the volunteers taking into account the modification by rules (4c) and (4i). A die is rolled, if necessary.

- (i) You may volunteer for a particular problem by an e-mail to me. This (in the order received) establishes priority among volunteers with the same number of points.
- (5) Class attendance and participation is required. After 3 absences from class 20 points will be subtracted from the student's class score and the count of absences is set again to zero.
- (6) Letter grades: Let H_{434} be the larger of the highest score among undergraduates and $5/6$ of the highest score among graduate students. Also, $H_{534} = 6/5H_{434}$.
 - (a) Letter grades in 434: If we cover all material of the lecture notes, an A, B, C, or D is earned by anyone who has at least 90%, 70%, 50%, or 30% of H_{434} , respectively.
 - (b) Letter grades in 534: If we cover all material of the lecture notes, an A, B, or C is earned by anyone who has at least 90%, 70%, or 50% of H_{534} , respectively (there is no D in graduate school).
 - (c) Should we fall short of covering all material the highest score will earn a B and the procedure is modified accordingly.

Tips:

- By working steadily and regularly, you will increase your chances to succeed in this course.
- Remember, being a full-time student is a full-time job.
- Seek help when you need it.

Disability Support Services

UAB is committed to providing an accessible learning experience for all students. If you are a student with a disability that qualifies under the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act, and you require accommodations, please contact Disability Support Services for information on accommodations, registration and procedures. Requests for reasonable accommodations involve an interactive process and consist of a collaborative effort among the student, DSS, faculty and staff. If you are registered with Disability Support Services, please contact me to discuss accommodations that may be necessary in this course. If you have a disability but have not contacted Disability Support Services, please call (205)934-4205 or visit <http://www.uab.edu/dss>.

Title IX Statement The University of Alabama at Birmingham is committed to providing an environment that is free from sexual misconduct, which includes gender-based assault, harassment, exploitation, dating and domestic violence, stalking, as well as discrimination based on sex, sexual orientation, gender identity, and gender expression. If you have experienced any of the aforementioned conduct, we encourage you to report the incident. UAB provides several avenues for reporting. For more information about Title IX, policy, reporting, protections, resources and supports, please visit the UAB Title IX webpage for UAB's Title IX Sex Discrimination, Sexual Harassment, and Sexual Violence Policy; UAB's Equal Opportunity and Discriminatory Harassment Policy; and the Duty to Report and Non-Retaliation Policy.