Linear Algebra (Math 201)
Sabancı University, Spring 2022-2023

We may have to revise the course plan according to the reassessment to be made country-wide, regarding higher education, at the beginning of April. The content to be delivered is certain but the method of course delivery, the number and dates of exams, and some other details are subject to change.
Updated on April 10, 2023.

Section A Lecturer: Canan Kaşıkcı
e-mail: canan.kasikci@sabanciuniv.edu
Office: FENS L017
Office Hour: Tuesdays 11:40 - 12:30.

Section B Lecturer: Nurdagül Anbar Meidl
e-mail: nanbar@sabanciuniv.edu
Office: FENS G047
Office Hours: TBA.

Class Hours and Lecture Format: Lectures will be live-streamed via Zoom. The Zoom links will posted on SUCourse+. In order to have access to them, you must be logged in to Zoom with your Sabancı account.

Lecture Hours:
Section A: Tuesdays 08:40 - 09:30 (FMAN 1099 and online),
Thursdays 08:40 - 10:30 (FMAN 1099 and online).

Section B: Tuesdays 08:40 - 09:30 (FMAN 1099 and online),
Thursdays 08:40 - 10:30 (FMAN 1099 and online).

You are responsible for every announcement made in the (online) lecture or in SUCourse+. Not attending the (online) lecture or not following SUCourse+ regularly is not an excuse, in case you miss something.

Recitation Format: Recitations will be live-streamed and held as Zoom polls integrated discussions with the TAs via Zoom. You can find the Zoom links for recitations on SUcourse+. In order to have access to them, you must be logged in with your Sabancı account. Students must attend the online recitation classes to which they are registered.

Recitation Hours: Thursdays 16:40 - 17:30 (A1, A2, A3, A4, A5),
Thursdays 17:40 - 18:30 (B1, B2, B3, B4, B5).

Course Content: Systems of linear equations, Gaussian elimination, vector spaces, subspaces, linear independence, dimension, change of bases, linear transformations, inner product, orthogonality, eigenvalues, eigenspaces and diagonalization.

Objectives: This course aims to introduce basic concepts of linear algebra such as vector spaces, bases, linear transformations, eigenvalues and eigenspaces. The course gives students training to develop their mathematical skills, analytical and critical thinking abilities, their ability to apply these capabilities to practical problems, and to communicate their knowledge of these areas.

Course Support Materials:

- Strang, G., Introduction to Linear Algebra, 5th edition, Wellesley-Cambridge Press, 2016.
- Axler, A., Linear Algebra Done Right, Springer.
- Leon, S. J., Linear Algebra with Applications, Prentice Hall.
- Bretscher O., Linear Algebra with Applications, 2nd Edition, Prentice-Hall, 2001.
- Poole, D., Linear Algebra: A Modern Introduction, 3rd Edition, Brooks Cole, 2011.

- Friedberg, S., Insel, A., Spence, L., Linear Algebra, 4th edition, Pearson, 2013.

Tentative Course Outline:

- Week 1-4: Introduction to vectors, matrices, solving linear equations
- Week 5-7: Vector spaces and subspaces
- Week 8-10: Linear transformations
- Week 11: Determinants
- Week 12-13: Eigenvalues, Eigenvectors, Diagonalization
- Week 14: Orthogonality (if time allows)

Learning Outcomes:

On completion of this course the student should be able to:

- Understand the notion of mathematical thinking, mathematical proofs, and able to apply them in problem solving.
- Present simple proofs in a precise and formally correct way.
- Solve a system of linear equations using matrix reduction.
- Do basic arithmetical operations with matrices.
- Understand the notions of linear independence, basis and dimension of a vector space.
- Find a basis and dimension of Euclidean or abstract vector spaces.
- Geometrically interpret the above concepts.
- Represent linear transformations as matrices and, conversely, interpret matrices as linear maps.
- Compute eigenvalues and eigenspaces of matrices.
- Identify whether a matrix is diagonalizable or not.

Grading:

Your grade exclusively depends on the below listed items. **There will be no other extra-credit opportunities**.

Midterm Exam (on May 3, 2023 at 19:40)	25%
Final Exam (on June 5, 2023 at 16:00)	65%
Lecture Attendance	5%
Recitation Grade	5%

The passing grade will be determined after the last exam. Be aware that this passing grade may not match the overall average of the students.

Midterm Exam:

The midterm exam will take place on Wednesday, May 3rd, 2023. It will be conducted online, via Zoom. Details of the midterm exam will be announced on SUCourse+.

Final Exam:

The final exam will be given in-person, on campus, during the finals period. The final may be given on any day between June 1st - June 11th. The date and time of the final exam is determined by Student Resources and the instructors cannot change it. The last day for grade submissions is June 15, so do not plan to leave İstanbul before June 15, 2023. We will not accommodate travel arrangements, or other personal business. (See also the make up policy below.)

Important Warning:

Every document that requires a student submission,

- must be in **pdf** format, and **hand-written**,
- must have **name, surname, student ID, and signature** on the top left corner of the document **on each page** submitted, that is if you write on the two sides of a piece of paper, write the information on both sides,
- **Sabancı Student ID card or a valid ID card with name and photo on it** must be placed on the top right corner of the **first page**.

Submissions must be uploaded as a **single pdf file**. Any submission that is not in the described format will **NOT** be taken into account. **Moreover, any content not covered in the lectures (definitions, Theorems, notations, etc.) will be completely ignored.**

Lecture Attendance:

In-class quizzes will be given randomly to check lecture attendance. These quizzes will be given either as Tophat questions or Zoom polls. Make sure that you have a Tophat account with your sabanciuniv.edu address. **There will be no make-up for any of those quizzes.** Students with time conflicts, please see the Registration Overrides section of the syllabus.

Recitation Grade:

You are expected to study the lecture notes before you enter the recitation so that you can actively participate in the discussion, there will not be a review of the course material. In each recitation, a certain number of pop-up questions will be presented to the students, via Zoom polls. Students attending their correct Zoom sessions will get the participation point if they also respond to the polls in due time. Please note that you might be asked to turn on your cameras during the Zoom polls. **There will be no make-up for any of those pop-up questions. Disturbing your classmates, being late, leaving early during online classes will not be tolerated and will affect your recitation grade.**

Supplementary Exercises:

There will be supplementary exercises assigned each week via SuCourse+. You are not expected to return the solutions but you are strongly advised to solve them (even if not in full detail) before the recitation.

Make Up Policy:

Make-ups are only allowed for the midterm exam and the final exam to those with an official report and to those with an official permission notice from the university on the date of the exam in question. Students must submit their reports/notices to the instructors before the exam in question. The ones having other excuses should contact the instructors within the day of the exam to be missed and then it will be decided whether these students are allowed to take the make-up exam. Any excuses to be brought to the attention of the instructors after the exam will not be considered. No exceptions to these rules! Make-ups for the midterm exam or the final will be at the end of the semester (during/after the finals period.) Only students who got permission for the makeup will be informed about the exact time and place. The make-up exam will contain all topics. **If the student do not contact with the instructor and do not take neither the exams nor the make-up, then (s)he gets NA.**

Academic Honesty:

All university policies on academic integrity apply to our course, and they will be enforced. (more information on http://www.sabanciuniv.edu/en/academic-integrity-statement).

Any form of academic dishonesty (plagiarism, copying/using other people's work, attending classes/exams on behalf of other people, etc.) will be penalized with 0 points for the related exam/attendance and disciplinary actions will be taken.

If we suspect any breach of academic integrity, we may ask for an oral validation of the exam. In this case the student will be invited to an oral interview and will be given the opportunity to explain their solution. If the student cannot provide sufficient explanations, or does not show up to the interview, their exam grade will be replaced with zero (0).

Class Discipline:

It is our responsibility to provide students with excellent teaching and learning environments. We are therefore asking you to respect both our responsibility to teach and the right of other students to learn. Any action that disturbs your classmates or disrupts the online activities is unacceptable. Repeated violations of the above common sense rules may cause a student to be counted as absent for a lecture or a recitation.

Suggestions:

- Attend the lectures and recitations regularly. Make sure you attend in your own (registered) section.
- Feel free to ask us and your teaching assistants questions in and out of class, especially during office hours.
- Math 201 is a combination of computational mathematics and theoretical mathematics (that is abstract definitions and Theorems). The computational aspects of the course will feel more familiar and easier to grasp, but we will also focus on the theoretical aspects of the subject. Whenever you encounter an abstract concept in the lecture, take a pause and give yourself some time to think about it.
- In linear algebra, definitions and Theorems build on each other quickly. If you fall behind, it will be difficult to catch up. Work hard from the beginning, and come to office hours immediately if you do not understand something.
- Studying out of class for this course should become a routine. Key to success in mathematics is practice.
- Students are expected to follow the announcements made during the lectures or in SUCourse. Not attending the class or not following SUCourse+ regularly is not an excuse, in case you miss something.

Registration Overrides:

Time conflict requests for lecture hours will be accepted. However, any and all negative outcomes that may result are solely the student's responsibility.