Linear Algebra (Math 201)
Sabancı University, Summer 2023-2024

This syllabus may be subject to update and change.

Lecturer: Tekgül Kalaycı
e-mail: tekgul.kalayci@sabanciuniv.edu
Office Hour: Mondays 11:40-12:30, by appointment.

Lecture Hours: Mondays 08:40 - 11:30 (FENS L055),
Tuesdays 08:40 - 11:30 (FENS L062).

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

Recitation Hours: Thursdays 17:40 - 19:30 (A1 FENS 2019),
Thursdays 17:40 - 19:30 (A2 FMAN G042).

Teaching Assistants: Güzem Çınoglu (A1) gulsemin.conoglu@sabanciuniv.edu
Kader Bulut (A2) kader.bulut@sabanciuniv.edu

Office Hours of Teaching Assistants: Güzem Çınoglu Thursdays 16:40-17:30
Kader Bulut Fridays 13:40-14:30

Course Content: Systems of linear equations, Gaussian elimination, matrices and matrix operations, vector spaces, subspaces, linear independence, dimension, change of bases, linear transformations, 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:

- Axler, A., Linear Algebra Done Right, Springer.

Tentative Course Outline:

- Lecture 1 - 4: Introduction to vectors, linear combinations, systems of linear equations, solving linear equations, matrices,
- Lecture 5 - 7: Vector spaces and subspaces, subspace criteria, linear independence, basis, dimension,
• Lecture 8 - 10: Linear transformations, matrix representation, change of bases,
• Lecture 11: Determinants,
• Lecture 12 - 13: Eigenvalues, eigenvectors, diagonalization.

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.

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<td>Midterm</td>
<td>45%</td>
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<tr>
<td>Final</td>
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<td>Recitation Grade</td>
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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.

Exam Dates:
The exams will be on the below listed dates and times. More detailed information will be available in due time.

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<tr>
<td>Midterm</td>
<td>August 3, Saturday, 15:00, FMAN 1099</td>
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<td>Final</td>
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The university will later announce the final exam date. The final may be given on any day between August 24th - 27th. Student resources will determine the dates and times for all final exams, and instructors cannot change it. The last day for grade submissions is September 3, so do not plan to leave İstanbul before September 3, 2024.

Lecture Attendance:
There will be no lecture attendance but attending the classes is strongly suggested.
Recitation Grade:
You are expected to study the lecture notes before you enter the recitation so that you can actively participate in the discussion. In each recitation, a certain number of pop-up questions will be presented to the students. There will be 6 or 7 quizzes and we will consider the highest 5. **There will be no make-up for any of those pop-up questions. Disturbing your classmates, being late, leaving early during 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 a health report confirmed by SU Health Center within 3 days of the date of the report and to those with an official permission notice from the university on the date of the exam in question.

Students must inform and submit their reports/notice to the instructor before the exam in question. The ones having other excuses should contact the instructor 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 instructor after the exam will not be considered. No exceptions to these rules.

Makeup for the midterms and the final exam will be held towards the end of the semester and will cover all the topics. Only students who got permission for the makeup will be able to take it. There is absolutely no make up for the make up exam.

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](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.

During the exams, students are **NOT** allowed to have any books, notes, electronic devices (including cell phones, smart watches, calculators, earphones, computers, etc.), or any other kind of supporting learning material. A student violating this rule will receive 0 points for that exam and disciplinary actions will be taken.

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 interrupts the lecture/recitation is unacceptable and may cause a student to be counted as absent for a lecture or a recitation.

Suggestions:
- Read this syllabus from top to bottom.
- Always come to lectures and recitations with a notebook and a pen.
- Feel free to ask me and your TA 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.