Linear Algebra (Math 201)
Sabancı University, Summer 2021 - 2022

This syllabus may be subject to update and change.

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Office: -
Office Hours: By appointment.

Lecture Hours: Tuesday 11:40 - 14:30 (FENS L029), Wednesday 14:40 - 17:30 (FENS L029)
Recitation Hours: Friday 14:40 - 16:30 (L065)

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

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 and SIAM, 2016. (Majority of homework problems will be assigned from this book.)
- 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.
- Gilbert Strang lectures on linear algebra, Lectures 1-34, Spring 2005, https://www.youtube.com/watch?v=ZK3O402wf1c&list=PL49CF3715CB9EF31D

Course Outline

- Lecture 1 - 4: Introduction to vectors, Matrices, Solving linear equations
- Lecture 5 - 6: Vector spaces and subspaces
- Lecture 7 - 9: Linear transformations
- Lecture 10: Determinants
- Lecture 11 - 12: Eigenvalues, Eigenvectors, Diagonalization
- Lecture 13: Orthogonality
- Lecture 14: Applications

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 (TBA)	45%
Final	55%

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.

Exams:

Exams will be given in-person, on campus. The dates will be announced later. More details will be announced on SUCourse+ in due time.

The university will later announce the final exam date. The final may be given on any day between September 3rd - 6th. Student resources will determine the dates and times for all final exams, and instructors cannot change it.

Exams are closed book. This means that during the exams, the use of books, notes, electronic devices (including cell phones, smart watches, calculators, computers etc.), or any other kind of supporting learning material is **NOT** allowed. A student violating this rule will receive 0 points for that exam.

Makeup Policy

Make-ups are only allowed 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 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. Dates and details of the make-up examinations will be announced later. **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.**

Homework

There will be homework problems assigned each week. They will not be graded. You are not expected to return the solutions but you are strongly advised to solve them and discuss during the next recitation.

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).
In particular, no form of cheating is welcome in the exams or quizzes, such as copying whole or part of each other's answers, using cheat-sheets etc. The action against such violations could range from getting a zero on the particular exam to explaining the case in front of the Disciplinary Committee.

Suggestions:

- 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.

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.