

MAT 531 M001 – 2nd course in Linear Algebra – Spring 2019

Contact Information

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Office Hours: Mo, We 2:30-3:30; Tu, Th 1-2; Su 12-1. You can also see me at other times by appointment (made online at <https://leonid.youcanbook.me>).

Class Time and Location: MWF 10:35–11:30, Carnegie 219.

Course Content

Catalog Description: Abstract vector spaces and inner product spaces, linear transformations and linear operators, eigenvalues and diagonalization. Primarily for mathematics majors. *Prereq.:* MAT 331 and MAT/CIS 375.

Textbook: “Linear Algebra” by Friedberg, Insel, & Spence, Pearson. 4th Edition. ISBN 9780130084514.

Course outline:

1. Vector spaces: fields, subspaces, linear independence, bases, dimension. (8 class periods, based on Appendix C and sections 1.2–1.7)
2. Linear transformations: null space, range, matrix representation, composition, invertibility, change of coordinates, dual spaces. (9 class periods, sections 2.1–2.7)
3. Brief review of determinants and their properties. (2 class periods, sections 4.2–4.3)
4. Diagonalization: eigenvalues, eigenvectors, invariant subspaces, the Cayley-Hamilton theorem. (6 class periods, sections 5.1, 5.2, 5.4)
5. Inner product spaces: norms, the Gram-Schmidt process, orthogonal complement, adjoint operator, normal, self-adjoint, unitary, and orthogonal operators (10 class periods, sections 6.1–6.5)

Course Policies

Grading. The grades will be based on homework (25%), quizzes (5%), three midterm exams (15% each), and final exam (25%). The grading scheme will be no stricter than: 93 for A, 90 for A-, 87 for B+, 83 for B, 80 for B-, 77 for C+, 73 for C-, 70 for C-, 60 for D.

Homework will be assigned in class on most days, and will be collected at the beginning of next class. You may discuss the homework problems with your classmates, but submitted assignments must be written up individually. Two lowest homework scores will be dropped.

Quizzes will be given at the beginning of class, and will be based on the material of previous class. Each quiz will consist of one True/False question. Two lowest quiz scores will be dropped.

Midterm Exams will be in class on **February 11, March 4, and April 3**. The cumulative **Final Exam** is scheduled for **Friday, May 3, 5:15–7:15 pm**. Unexcused absence from an exam counts as zero. If the absence is excused, your grade on the relevant portion of the final will be used to replace the missed exam.

Calculators cannot be used during exams or quizzes.

Attendance and Participation: You are expected to attend and participate in class. If you miss a class, you are responsible for obtaining notes for that class from a student who attended. It is also your responsibility to find out about any announcements made in class.

Learning Goals:

- Students will develop ability to think deductively, analyze mathematical statements, and apply mathematical ideas to the solution of new problems.
- Students will learn to write proofs of mathematical statements related to the topics covered in this course.
- Students will understand the nature and role of deductive reasoning in mathematics
- Students will be able to follow proofs and other mathematical discourse

Tips for success in this course:

- It is absolutely essential that you understand how to solve all the assigned problems. Once you understand how to solve a problem, write your solution down neatly and in full detail with explanations that make your reasoning clear.
- Don't fall behind. If you are having difficulties keeping up with the material, see me immediately to discuss the problem.
- Ask questions: in class, after class, during office hours, or by email.

University Policies

Students with disabilities. If you believe that you need academic adjustments (accommodations) for a disability, please contact the Office of Disability Services (ODS), visit the ODS website—<http://disabilityservices.syr.edu>, located in Room 309 of 804 University Avenue, or call (315) 443-4498 or TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting academic adjustments. ODS is responsible for coordinating disability-related academic adjustments and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since academic adjustments may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Academic Integrity. Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization

in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice.

The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level.

Complete policy: <http://class.syr.edu/academic-integrity/policy/>

Religious observances policy. SU religious observances policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes. For fall and spring semesters, an online notification process is available through MySlice (Student Services -> Enrollment -> My Religious Observances) from the first day of class until the end of the second week of class.