

Math 471: Topics in Linear Algebra
Spring 2023 – Syllabus

Class Number: 39680R
Time: MWF 11:00-11:50
Location: KAP 140

Office hours: TBD
Instructor: Robert Guralnick
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Course Description: This course is an introduction to fundamental ideas in linear algebra. Some familiarity with matrices and vector spaces will be assumed. A rudimentary knowledge of groups and rings will also be useful. In particular, it would be useful to have had a course in abstract algebra such as Math 410. We will start with a review of the material in 225. We will cover the material in greater depth. We will discuss polynomial rings and then apply this theory to theory of linear operators and canonical forms (rational and Jordan). We will discuss various other topics in linear algebra including quadratic forms, Hermitian and unitary matrices and positive matrices as time permits.

Prerequisites: Math 225 or permission of instructor; a basic knowledge of linear algebra and matrices is needed. Moreover, as the material in this course is much more abstract than the calculus sequence, 225 provides at least an introduction to more abstract ideas. It is also recommended that you have taken Math 410 or its equivalent.

Grading: There will be homework assigned and graded. In addition there will be two midterms (dates to be determined) and a final exam. The midterms and the homework will each be 20 percent of your grade. The final will be 40 percent. You can drop the lowest of five scores (viewing the final as two; so for example, you can drop the homework, one of the midterms or half the final).

Homework will be posted (roughly weekly) and collected in class for grading. The final is scheduled for Wednesday, May 3rd from 11 – 1. The final cannot be anticipated.

The final is scheduled for Wednesday, May 3rd, 11–1 and may not be anticipated.

The book is a new book that has yet to be published but is being made available via the bookstore for less than \$35. The book is Matrix Mathematics: A second course in Linear Algebra by Garcia and Horn. The material during the lectures may be somewhat different than what is in the book. You are responsible for

both. The best way to learn this material is to work out many many problems (and doing proofs). In addition to doing the assigned problems, you should do as many others as possible.

Academic Integrity: The exams are all "closed book" and when taking them you may not use notes, consult with others, or copy from others. Since the collected homework problems count toward the course grade, the work you turn in is to be yours alone. You may ask me or the TA for hints or discuss the problems with other students , but otherwise for those homework problems to be handed in for grading, you may not copy solutions from anyone else or any other source, including from those at the Math Center. Violations of these policies are extremely serious.