

12 Honors Algebra II  
Spring 1998  
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Text: LINEAR ALGEBRA, by K. Hoffman and R. Kunze, second edition (1971)

Comments: The book is challenging for sophomores, but this is okay for a honors course. The book has lots of good problems, of varying levels of difficulty--again, a good thing. On the other hand, the book gives no geometric intuition for what's going on, and avoids important geometric applications of the material. For example, as far as I can tell, the authors do not mention the connection between the determinant and volumes of parallelopiped. Furthermore, the authors avoid using certain standard mathematical notation: rather than saying "let  $f: X \rightarrow Y$  be a function", they say "let  $f$  be a function which assigns to each element  $z$  of  $X$  an element  $f(z)$  of  $Y$ ". This makes theorem statements too wordy. I also dislike the authors' use of "range" when I would say "image", since this conflicts with what I think of as standard mathematical usage.

In general, the students had trouble reading the book, and tried to avoid it; to some extent, this is because reading a real math book is hard, but it is also due to the idiosyncratic writing style of this particular book.

To summarize: the book is fine, but not ideal. I'm not sure that there is an ideal linear algebra book, particularly for honors students, but it wouldn't hurt to look around a bit more.

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Material covered:

Chapter 5: Determinants  
Section 1 (briefly)  
Sections 2-4  
Sections 6-7 (briefly)

Chapter 6: Eigenvalues, eigenvectors, etc.  
Sections 1-6

Chapter 7: Canonical forms  
I summarized rational form and Jordan form in one lecture.

Chapter 8: Inner product spaces  
Sections 1-5

Chapters 9, 10: Sesquilinear and bilinear forms, the spectral theorem

I finished the semester with lectures summarizing some of the main points of these chapters.

Comment: I wonder if it would be a good idea to spend more time on dual vector spaces and quotient vector spaces, since these are both important in later math courses.

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Exams: I gave two exams, the second of which was an open book take-home exam. The students seemed to like this format. From my point of view, it freed up some class time, and I could ask harder questions. (And why not make full use of the honor code?)

Homework: I gave weekly homework assignments, copies of which can be found in the www directory. I also wrote up solutions to these problems.