

**Advanced Linear Algebra = Math 117. Syllabus and Lecture schedule. Spring 2009.**  
**prof R Montgomery**

class meets MWF 2-3:10 in Social Sciences II, room 159

Montgomery's office: 357B Kerr, ; hours: W 9-10. 5 -6 and by appt. \*\* be attuned to changes here!

class web site : <http://count.ucsc.edu/~rmont/classes.html>

no TA. no Reader.

TEXTS: 'A (Terse) Introduction to Linear Algebra" by Katznelson and Katznelson. AND 'Schaum's Outlines : Linear Algebra' by Lipschutz.

**Evaluations and grade breakdown :**

HOMEWORK [HW] AND CLASS participation: 25 %

( HW will be assigned at typically weekly, usually due Fridays.)

MIDTERM. 25 % ;

FINAL 50 % ; FINAL EXAM.

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: NOVELTY: you will be grading some (all?) of each other's HW in class.

**SPECIAL DATES**

I will not be lecturing: April 10. May 15. I will probably have substitutes.

Midterm: May Day = May 1.

Final exam date : Wednesday, June 10 4:00:00 P.M.

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**Lecture schedule:** We will follow the text, 'A (Terse) Introduction to Linear Algebra" a chapter a week, with the exception of chapter 2, which we will spend two weeks on. We will probably skip all \*ed sections. For each week, in brackets, I've put the relevant chapters from Schaum's outline. These texts work best in concert.

Thus: week 1: ch 1. Vector spaces. Linear (in)dependence, spanning, basis [ch 1, 2, 5]

week 2: ch 2: Linear operators and matrices [ch 3, 4, 8, 9, 10]

week 3: ch 2, continued w linear operators and matrices [ch 3, 4, 8, 9, 10]

week 4: ch 3: dual spaces [ch 12]

week 5: ch 4: determinants and multi-linear maps. Midterm [ch 7]

week 6: ch 5 characteristic vs minimal polynomial; invariant subspaces [ch 8]

week 7: ch 6 throws an inner product into the mix. Self-adjointness. [ch 6, 14]

week 8: ch. 7: Normal form theorems " structure thms" (Jordan canonical form) [ch 11, 8]

week 9: ch 8: 8.1, 8.2, 8.3: additional topics (notably Perron-Frobenius) [ch 13]

week 10: review.

\*\*\* WARNING. the text is written like a real math book. Very few digressions. No boxes. Very to the point. 1 page of this text is 'worth' 10 to 20 pages of the texts you are more used to (eg your calculus text). READ IT AS SUCH: expect it to take an hour to understand a page, and be joyous if it takes you only 10 minutes to understand a page. Skip around and USE THE INDEX and appendices as needed. Read with (scratch) paper and writing implement at hand to mess with examples. IF YOU WILL NOT OR CANNOT MAKE UP YOUR OWN WORKED EXAMPLES of the theory : then go to Schaum's to read the 100s of worked examples there.