

Mathematics 60 – Linear Algebra

Claremont McKenna College, Fall 2011

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Office Hours: **TTh 10-11:45 AM and by appt.**

The text for this course is Curtis' *Linear Algebra: An Introductory Approach*. Class is from 9:00 to 9:50 AM in RN 103 every Monday, Wednesday and Friday. Regular attendance is encouraged.

Topics we will cover in this course include number fields, proof by induction, vector spaces, subspaces, linear dependence and independence, basis and dimension, row equivalence of matrices, systems of linear equations, matrix algebra, inner product spaces, determinants, eigenvalues and eigenvectors, invariant subspaces, canonical forms, dual spaces, bilinear forms, tensor products and applications.

Attached is an approximate course calendar showing which sections I intend to cover on which days. Each day, I will give a lecture explaining concepts, proving theorems and showing examples for that day's topic. In addition to taking notes during the lectures, you should read the appropriate sections in the textbook and work some of the exercises from the section; solving problems on your own and writing explanations of your solutions is the best way to make the concepts your own and is crucial for learning the material. Note that the exercises from the book will not be collected or graded.

Grading will be as follows:

- 30%** - weekly take-home assignments
- 40%** - two midterms
- 30%** - final exam (**Wednesday, December 14 9:00 AM - 12:00 PM**)

My grading policy is explained on my website, which you should read carefully. In summary, we will use a 5-point scale for grading problems, designed to ensure uniform and fair grading.

30% of your grade will come from weekly take-home assignments. These will be handed out in class and also posted to my website, in case you need a new copy. We will drop the lowest homework score when determining the final grade.

The midterms will have around eight problems plus some bonus problems. The final will be cumulative, will have around sixteen problems plus some bonus problems and will be given in RN 103 on Wednesday, December 14 from 9:00 AM to 12:00 PM. Before each exam, I will post a review sheet to the above-listed website. The review sheet will list definitions, theorems, concepts and applications you will be expected to know for the exam.

Since late take-home assignments will not be accepted, we will drop the lowest homework score. Make-up exams will be permitted only with a valid reason and should be scheduled ahead of time. Calculators are permitted but are neither required nor necessarily helpful – you cannot simply write a number or formula and expect to receive credit, as your grade is based on your *explanation* of your answer, not just the answer itself. Cheating in any form will not be tolerated.

You are encouraged to come to my office hours with any questions or concerns you might have; my office hours are there for you. You can also send me questions through email at **Sam.Nelson@cmc.edu**, via AIM/Y!IM/FB at **ProfSamNelson**, or via SMS.

Math 60 Lecture topics and Calendar, Fall 2011

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| <ul style="list-style-type: none"> L1 Fields L2 Induction L3 Vector Spaces L4 Subspaces L5 Linear Dependence L6 Basis and Dimension L7 Row equivalence L8 Finitely Generated Vector Spaces L9 Systems of Linear Equations L10 Homogeneous Systems L11 Gaussian Elimination L12 Linear Transformations L13 Matrix Algebra L14 Elementary Matrices L15 Linear Transformations and Matrices L16 Inner Products L17 Inner Products II L18 Determinants | <ul style="list-style-type: none"> L19 Existence and Uniqueness of Determinants L20 Multiplication Theorem L21 More about determinants L22 Polynomials L23 Complex Numbers L24 Eigenvalues and Eigenspaces L25 Invariant Subspaces L26 Diagonalization L27 Triangular Form L28 Rational and Jordan Canonical Form L29 Quotient Spaces and Duals L30 Bilinear forms and Duality Bonus Special Relativity in 50 Minutes L31 Direct Sums and Tensor Products L32 Applications L33 Applications L34 Applications |
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August

M	W	F
	31 Intro	

September

M	W	F
		2 L1
5 L2	7 L3	9 L4
12 L5	14 L6	16 L7
19 L8	21 L9	23 L10
26 L11	28 L12	30 L13

October

M	W	F
3 L14	5 Review	7 Mid 1
10 L15	12 L16	14 L17
17 Break	19 L18	21 L19

October Continued

M	W	F
24 L20	26 L21	28 L22
31 L23		

November

M	W	F
	2 L24	4 L25
7 L26	9 L27	11 L28
14 L29	16 L30	18 Review
21 Mid 2	23 Bonus	25 Break
28 L31	30 L32	

December

M	W	F
		2 L33
5 L34	7 Review	9 Review

FINAL EXAM: Wednesday, December 14 9:00 AM - 12:00 PM