

SYLLABUS - MATH 3191: *Applied Linear Algebra*  
Spring Semester - 2009

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Text: *Linear Algebra and its Applications 3<sup>rd</sup> Edition* by David C. Lay, Addison-Wesley, 2006.

Office Hours: Mondays 10:45am – 11:45am

Tuesdays 3:00pm – 4:00pm

Wednesdays 2:30pm – 3:30pm

Other times by arrangement

We will cover the following sections of *Linear Algebra and its Applications* by David Lay: 1.1-1.8, 2.1-2.5, 4.1-4.7, 5.1-5.3, 6.1-6.5, 6.7, and 7.1.

We will not be skipping determinants, but instead do the quick coverage in 5.2. This material represents the basic core topics and those most important in applications. In order to cover it all, we will have to average a little better than one section per class. There are several nice sections on a variety of applications (1.9, 2.7, 2.8, 4.8, 4.9, 5.6, 5.7, and 6.6). These are assigned as optional reading assignments, but will not be covered in class or on exams. However, there will be a project along with a short paper (say 5-10 pages) on one of these applications or some other application of your choice. The project paper is to be turned in at the latest by Friday May 8, 2009 at 5pm, but you can turn it in whenever you want before that.

The lectures, material in the book, and exams and quizzes will contain a mixture of theory and computations. The beauty of this subject is the way that the theoretical and computational components interact.

## EVALUATION

There are three evaluative criteria: (i) eleven short roughly weekly take-home quizzes, (ii) two exams, a midterm and a final, and (iii) a research paper. Evaluation is based on a point system so that it is very important that you complete tests and quizzes as thoroughly as possible rather than taking a zero score. Please bring a scientific calculator to class to all exams.

**QUIZZES:** There will be 11 take-home quizzes due at the beginning of class on Mondays (February 2, 9, 16, 23; March 2, 9, April 6, 13, 20, 27; May 4). Take-home quizzes are worth 20 points each. Take-home quizzes will be handed out on the previous Wednesday. *There are no make-up quizzes given without a*

*legitimate excuse.* To compensate for unforeseen circumstances (beyond your control or your own choice), there is one extra quiz so the lowest quiz grade will be dropped if you turn in 11 quizzes. If you miss a quiz, that will be one that you drop. If you have a legitimate excuse for missing your second (or more) quiz, please see me. Please make your take-home quizzes neat and if you turn in more than one page, **please, please staple** the pages and number the pages with your name on each page.

**EXAMINATIONS:** There will be two exams, the second of which is a (comprehensive) final. The first test will be Wednesday March 18<sup>th</sup> and is worth 100 points. The test will be over the material we've covered through and including March 11th. The final exam will be either Monday May 11<sup>th</sup> or Wednesday May 13th and is worth 150 points. The final is comprehensive with approximately 50 points being from the material covered on your first exam and approximately 100 points being from the remaining material. Note: **If you need to change the time that you take an exam, a minimum of a two week notification is required.**

**PROJECTS:** Your project will be a short paper (say 5-10 pages) on one of the applications at the end of each chapter or some other application of your choice and approved by me. This paper is to be turned in at the latest by Friday May 8, 2009 at 5pm, but you can turn it in whenever you want before that. Further instructions will be given out.

### **Point Distribution**

Test 1	100
Final	150
Quizzes	200
Project	50
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Total	500 points

The following distribution of grades is guaranteed. However, the final distribution could be "curved" downward.

A+ 97-100%, A 93-96.9%, A- 90-92.9%  
B+ 87-89.9%, B 83-86.9%, B- 80-82.9%  
C+ 77-79.9%, C 73-76.9%, C- 70-72.9%  
D+ 67-69.9%, D 63-66.9%, D- 60-62.9%

**TEXT PROBLEMS:** You may optionally work the problems listed below. I will hold you responsible for doing these, though I will not collect these problems.

However, the spirit if not the actual contents of some of these problems may be part of the exams.

### **Text problems to optionally do**

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1. 1.1 Pg. 11-13 *1-31(odd), 33(optional)*
2. 1.2 Pg. 25-27 *1-31(odd)*
3. 1.3 Pg. 37-39 *1-25(odd) 27&29(optional)*
4. 1.4 Pg. 47-49 *1-39(odd), 41(optional)*
5. 1.5 Pg. 55-56 *1-33(odd), 35&37&39(optional)*
6. 1.7 Pg. 71-72 *1-39(odd)*
7. 1.8 Pg. 79-81 *1-23(odd), 29,31*
8. 1.9 Pg. 90-91 *1-35(odd)*
9. 2.1 Pg. 116-117 *1-33(odd)*
10. 2.2 Pg. 126-127 *1-31(odd),*
11. 2.3 Pg. 132-133 *1-39(odd),*
12. 2.5 Pg. 149-150 *1-21(odd),22-26(try some)*
13. 4.1 Pg. 223-225 *1-31(odd)*
14. 4.2 Pg. 234-235 *1-35(odd)*
15. 4.3 Pg. 243-245 *1-31(odd), 33(optional)*
16. 4.4 Pg. 253-255 *1-31(odd)*
17. 4.5 Pg. 260-262 *1-31(odd)*
18. 4.6 Pg. 269-270 *1-33(odd)*
19. 5.1 Pg. 308-309 *1-31(odd)*
20. 3.1 Pg. 191 *1-13(odd)* 3.2 Pg. 199 *1-9(odd)*
21. 5.2 Pg. 317-318 *1-27(odd)*
22. 5.3 Pg. 325-326 *1-29(odd),*

23. 6.1 Pg. 382-383 *1-31(odd)*
24. 6.2 Pg. 392-393 *1-31(odd)*,
25. 6.3 Pg. 400-401 *1-23(odd)*,
26. 6.4 Pg. 407-408 *1-19(odd)*,
27. 6.5 Pg. 416-417 *1-17(odd)*
28. 7.1 Pg. 454-455 *1-35(odd)*,

**General advice:** Keep all materials that I turn back in case you think I have not credited you with the points you earned. I can only correct your score if you have what I have turned back to you. It is a good idea to xerox anything that you turn in just in case I lose what you turn in. Please check to make sure that the points you earned are the points I have recorded. Note: The statistics that I have read about correctness of professors in recording grades state that there is a 6% error rate in our recording of your grades. Please make sure that I have correctly recorded your points.

**Advice on exam taking:** It is wise that you take the exams given in this class as follows. Do all the problems you can do first. Don't waste too much time on making sure that you have done your arithmetic correctly since arithmetic mistakes are usually discounted at half a point per mistake unless your arithmetic mistake totally trivializes the problem in which case the deduction will be severe. That is, you should work on generating the most number of points per unit of time that you expend.