MATH 221 — Introduction to Linear Algebra  
Spring, 2016

Instructor:  
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We will cover much of the first 7 chapters of the text, although not entirely in the book’s  
order. See the Assignment Schedule (in Blackboard) for more detail.

Schedule:  
Class will meet TuTh 10:00–11:15 in MP 101  
Office hours: TuTh 11:15–12:40 — and by appointment

The Midterm Exams will be Thursdays 2/25 and 4/7  
The Final Exam will be Tuesday 5/17 10:30-12:30; in MP 101

Classes: You will be expected to have prepared for class: read the relevant text material, started  
work on the assigned problems, begun discussing this with your ‘buddies’ in advance — in time  
to ask questions on Thursdays, before the quiz. Class is not a substitute for this — neither  
is the class preparation a substitute for the class. A major function of the class itself is to  
provide an opportunity to ask questions and the ‘lecture’ part of classroom activity provides  
an opportunity to give emphasis (what is most important) and a perspective on material. Your  
role in class is to participate actively, mostly by asking questions. [The book’s role is to  
be available at all hours — as a reference, as the basis of your notes, to provide examples as  
needed, to be the source of HW problems, etc.]

Course Description:  
There are four related aspects of this course:  
1. Matrix notation and arithmetic; row reduction  
2. Solving linear systems  
   We start with this computationally, but  
3. Geometry and structure (dimension)  
4. Some additional material  

We emphasize understanding rather than computational details since in practice we mostly  
need to know what the results mean.

Exams: There will be a quiz (1 or 2 problems, selected from the assigned HW problems) each  
Tuesday. See the Assignment Schedule for details. The class exams will contain problems  
which will require understanding and may actually require you to think during the exam! The  
exam questions may or may not be like the homework, but in advance of each Exam I will  
provide a Practice Problem Set (Sample Exam) to give some idea of what to expect. The
usual University rules apply for exams. [In general, there will be make-ups for Exams only in case of exceptionally extenuating circumstances (e.g., documented emergencies). I will expect a grader to handle the quizzes, but I will grade the exams myself.]

Tentatively, there will be two (one hour) Midterms and the Final Exam. In addition (to be turned in at the time of the Final), is a ‘take-home’ part of the Final, consisting of the following two questions:

(i) What have you learned in this course? (This should include a selection of some important/useful/interesting thing in the course, with some explanation of your choice.)
(ii) What grade do you think you deserve for this course (and why should I think so)?

**Assignments:** See the schedule on Blackboard. Homework assignments are given in weekly ‘sets’, based roughly on material to be discussed in class during the week preceding the due date. You should be doing them (and asking related questions) during that week (or before) so you are prepared for the quizzes and exams.

**Learning Goals:**

1. A central goal is an understanding\(^1\) of the possible results seen in solving systems of multivariate linear equations.

2. We must learn the arithmetic of matrix-vector notation and understand how it is related to the arithmetic of numbers and why one bothers with these definitions.

3. The course introduces a lot of new technical vocabulary\(^2\) for a lot of new concepts initially related to solving systems. Learning this vocabulary is then a key to understanding the concepts and how they are related. Some additional technical vocabulary\(^3\) and concepts are related to other applications of Linear Algebra.

**Grading:** I consider ‘C’ a normal grade, indicating satisfactory\(^4\) performance; therefore a ‘B’ must mean performance which is noticeably better than just ‘satisfactory’; an ‘A’ grade means excellence. Roughly, ‘A’ for 90+%, ‘B’ for ‘80’, ‘C’ for 65%, ‘F’ for <50%.

I will compute the letter grade in two ways:

(i) based on the Final alone and
(ii) based on: quizzes=20%, class exams (combined)=40%, final exam=40%.

I will take the take-home part of the Final strongly into account if (i), (ii) give different results or if you are near a dividing line.

The course grade will not be more than one letter away from the result of (i) — except that you cannot get a ‘satisfactory’ grade in any case if you still get significant ‘basic material’ wrong\(^5\).

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\(^1\)While we begin with computation, one notes that no sane person actually does this computation by hand for the size problems arising in real applications. However, it is important to understand what the results mean.

\(^2\) ... for example: linear dependence, subspace, basis, dimension, invertible.

\(^3\) ... for example: norm, orthogonalization, eigenvalue/eigenvector.

\(^4\) If, of the material which you should know, there is more than a third which you don’t know, that would be unsatisfactory.

\(^5\) Don’t be a mumpsimus!
[If there is some justifiable reason for you to get an Incomplete in the course, prior arrange-
ments should be made before the last class.]

Study with a buddy! It is not only acceptable but *encouraged* for students to study together and
to work jointly on the assignments. Individual study is needed, but no amount of individual
study provides quite the same advantage as the opportunity to explain things in your own
words to someone else — definitions, procedures, theorems, and how to apply these to concrete
examples (problems). This should become a regularly scheduled part of your activity. (For
pretty much anything: *If you can’t explain it, you don’t (really) understand it.*)

In addition, you should be prepared for the possibility of missing a class by having
*telephone numbers, etc.* of several classmates from whom you could then get information
about announcements, assignments, details of what was covered, important insights, etc.