

7 January 2008

Course: SM261. Matrix Theory. Spring 2007-2008.

Section: 1001. Meets Period 1 on Monday, Wednesday, and Friday.

Instructor: Professor and Associate Dean Frederic I. Davis.

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Extension: 3-1586.

Text: *Linear Algebra with Applications* by O. Bretscher
Third edition, published by Prentice Hall, 2005.

Tools: *Texas Instruments TI-89 or TI-92 Plus or Voyage 200* Graphing Calculator
Maple Symbolic Computation System
Mathematica

Blackboard: You are enrolled in the Blackboard course designated **MATRIX THEORY:SM261/1001(Spring-2008-2)**. Your usual login and password used on the Naval Academy Data Network will grant you access. The URL for Blackboard is

<https://blackboard.usna.edu>

The current structure of this website is as follows.

Announcements

Administration (*this document, assignments, the section roster, bios, pictures*)

Tests & Solutions (*solutions to selected exercises, practice tests, past examinations*)

Course Notes (*supplemental notes on selected topics*)

References, Links (*variety of information about linear algebra on the Internet*)

Course description: A description of this course and its objectives may be found on MIDS. These objectives are achieved, for the most part, by working through the lesson assignments.

Grades: Class participation, homework, quizzes, special assignments, 3 tests (2 in-class and, possibly, 1 team take-home, and a final examination will be evaluated. Grades for this course will be determined as follows (in particular, notice the weighting for the final examination).

$$\langle \text{progress grade} \rangle = 0.80 \cdot \langle \text{tests} \rangle + 0.20 \cdot \langle \text{assignments, quizzes, classwork} \rangle$$

$$\langle \text{course grade} \rangle = p \cdot \langle \text{semester progress} \rangle + f \cdot \langle \text{final examination} \rangle$$

where $p + f = 1$ and p is 0.6 or 0.4, whichever yields the higher course grade.

Objectives: This course is the basis for several other courses you may take later in mathematics or economics at the Naval Academy and it is important preparation for graduate work in many areas of mathematics, science and engineering. Your primary objective is comprehension of mathematical ideas. You will learn many facts and acquire a collection of skills. But all of this will be a small achievement compared to your developing an understanding of linear algebra, one of the great achievements of the human intellect. As part of the process of becoming mathematically educated, this course will provide a first acquaintance with mathematical abstraction. Almost synonymous with abstraction is generalization. Herein lies the great power of mathematics; it is what makes the same mathematics applicable to many diverse areas of science and engineering. It is a wonder that the same equations and the same analysis that apply to one subject apply to an apparently totally unrelated subject in a completely different discipline. More important than ever before in your education will be a careful use of language.

Another objective of this course is to improve your ability to read technical material and express yourself, with precision, both orally and in writing. Your understanding of and your careful use of the terms and theorems in this course are essential. A casual acquaintance with the vocabulary and tools of this subject will not suffice.

Homework: Please note that homework is the most critical part of the course. The lesson assignments will be distributed in class and kept current on Blackboard. It is only by diligent work on the problems that mastery of the material is possible. Don't deceive yourself into thinking that you understand a subject just because you have a pretty good idea from the class discussion or reading assignments. Until you can apply what you have read and heard, your understanding has not been verified. Since the solutions to all of the odd-numbered problems appear at the end of the text, you will find this to be of significant assistance.

Homework papers must be neat. Ragged papers ripped out of a notebook are unacceptable. I will not attempt to decipher sloppy or garbled writing and will give no credit to papers that are illegible or are unintelligible because of poor English. In particular, **you must write in complete sentences**. A complete sentence has a subject and a predicate that contains a verb. The same is true when you write mathematics. A sequence of mathematical expressions unconnected by a verb is not a sentence and is not a logical thought. Feel free, however, to use standard mathematical abbreviations and symbols. For each exercise, state the problem succinctly and, unless the solution is a straightforward calculation, provide some discussion of your solution.

I expect you to have at least read but not necessarily mastered the material for each day's lesson. Meaningful class participation depends on your having done the assigned reading and having worked the assigned problems.

Computations: Most of the computations in this course can be done with pencil and paper. In fact, it is important that you become facile with the computational techniques we use before you begin to employ a calculator. Nevertheless, for homework problems that involve considerable arithmetic, you are free to use a hand calculator or *Maple* or *Mathematica*. Suitable hand calculators include the TI89, TI92+, and Voyage 200. There is a set of notes on Blackboard on the syntax of the commands used for the important computations in this course. No calculator will be allowed on Test 1 or 2. Calculators will be allowed on Test 3 and part of the final examination.

Taking notes: Most students take some notes in class. That is your choice. However, let me make some observations about note taking. Some students take notes in class thinking that this, in itself, is a learning activity. It usually isn't. If you don't rewrite or, at least, very carefully read what you have written, I think you would have done better if you hadn't taken notes at all and had been more attentive to the discussion. I also notice that many students copy only what I write on the board. Perhaps I should always write everything I say on the board. However, I don't. For example, I may want to face you to discuss an important idea and observe your reaction. You should be able to gauge when something is important, even if I don't put it on the board and draw a box around it.

Extra Instruction: Please don't hesitate to make an appointment to see me out of class. To be certain, call or send e-mail. If you need help, I expect you to see me as soon as possible. You shouldn't regard it as a sign of surrender to ask for help and I won't regard it as a sign of weakness if you do. To the contrary, I enjoy getting to know midshipmen outside of class and find that I can add to the understanding of even the best students by such direct conversations.

Questions: If you have a question about this course, I expect you will ask it if we are in class. On the other hand, the question may occur to you when we are not in class. I invite you to ask it by using email. I will respond as soon as I can. If this seems to me to be a question that may be of general interest, I will provide an answer for the whole class and I may post it on Blackboard.