

**MATH 340 SYLLABUS, Spring Semester, 2005-06 Academic Year**  
**Lec. 1, TR 9:30–10:45 AM, B239 Van Vleck Hall**

Prof. Richard A. Brualdi  
Office: 725 Van Vleck Hall

Text is:  
*Linear Algebra, 2nd ed.*  
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Office Hours: Mon (3:30–4:30 PM), Tues. (11:00 AM–12:00 noon), Thurs. (8:30–9:00 AM)

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TA: Guillermo Mantilla (Office Hours to be determined)

**Course Description** This is a first course in linear algebra—systems of linear equations, matrix theory with computations and applications, determinants, vector spaces, linear transformations, inner product spaces, and eigenvalues/eigenvectors.

**Study Habits** If you are coming into this course, as most students are, having just finished the calculus sequence, you will notice some change in emphasis from the problem-oriented calculus. There are many ideas and concepts in this course that we will explore and interrelate. We will explain some proofs, in order to understand the implications of the various ideas and their dependency on each other. You will be expected to do some simple proofs relating the various concepts and ideas. Of course, we also want to be able to compute and solve problems. There are software tools for solving problems, notably MatLab. We will not explain MatLab in this course. Once you understand the ideas, then solving problems in MatLab is a breeze, but you have to know what answers mean, how to interpret them, how to use them, etc. and this is what you will learn in this course.

There are three resources for you for learning the material in this course: the lecture, the book, and the discussion session assigned to you each week. It is important that you make use of each of these different resources. In the lecture I will be less formal than the book and will try to motivate you to study and understand the material in the book. Ideally, you should do a first reading of the sections covered in the book before they are discussed in lecture. In the discussion sessions, the TA will answer your questions and go over problems/exercises—this is basically a weekly problem session. We will be moving at a good pace so it is important not to get behind, as it takes some time to understand all the concepts and their relation with one another. Really, you should be devoting 6–8 hours each week to this course outside of the class.

**Exercises (Very important)** There are two kinds of exercises in this book—**problems** scattered throughout each section, with answers or helpful hints to most of them in the back of the book, and **exercises** at the end of each chapter, many of which also have answers or helpful hints in the back of the book. You should do **all of the problems for the material that we cover**; this is the way you will get to understand the concepts and ideas and be able to work with them. Problems will be discussed in discussion sessions after each section is finished in lecture. For each section and each chapter I have selected some of the problems and exercises to be handed in for marking. These constitute a bare minimum

of problems/exercises. **You will be fooling yourself if you think you can succeed by just doing the problems/exercises that are to be handed in.** Exams will have problems very similar to the problems in the sections (assigned or not), the assigned exercises at the end of each Chapter, and those done in lecture. There are many exercises similar to the assigned ones that you can do for extra practice. Note that the last exercise of each chapter is a kind of summary exercise that I recommend that you do. These can also be gone over in the discussion sessions.

**Your work on these exercises—not just the answers—should be well-presented in good English, and not written carelessly.** While you can discuss the exercises with classmates, **the work you hand in should be your own write-up and not copied from someone else.** The assigned homework will be worth 85 points. **Late assignments will not be accepted, but there are 91 problems/exercises for 85 points.** I allow myself the possibility to increase someone's homework score based on participation in lecture and discussion sessions (as reported by the TA).

**Exams** There will be **two in-class exams** during the semester, **each worth 90 points**, and a **final exam, worth 135 points** - see the accompanying schedule. I do not intend to give make-up exams.

### **Exam Schedule**

- Exam 1 on Tuesday, February 28 (in class).
- Exam 2 on Tuesday, April 11 (in class) .
- Final Exam: Friday, May 12, 10:05 AM

Check your schedule against the exam schedule now before it is too late to drop the course.

### **Proposed Weekly Schedule**

- Week of January 16: Sections 1.1–1.6
- Week of January 23: Sections 1.7–1.8, 1.9.1
- Week of January 30: Sections 2.1–2.4, 2.5.1
- Week of February 6: Sections 3.1–3.3
- Week of February 13: Sections 3.3–3.5
- Week of February 20: Sections 3.6–3.8
- Week of February 27: Exam I plus Section 3.9.1
- Week of March 6: Sections 4.1–4.4
- Week of March 13: SPRING BREAK

- Week of March 20: Sections 4.5–4.6
- Week of March 27: Sections 4.7.2, 5.1–5.2
- Week of April 3: Sections 5.2-5.6
- Week of April 10: Exam II (I will be out of town this week)
- Week of April 17: Sections 5.7–5.8, 5.9.1
- Week of April 24: Sections 6.1–6.2
- Week of May 1: Section 7.1

**Grades** These will be based on a **total of 400 points** according to the following standard (and exams will be constructed with this standard in mind; if necessary I will adjust exam scores by adding points):

Grade	Accomplishment level	Points
<i>A</i>	<b>superior</b>	370 ↑
<i>AB</i>	<b>excellent</b>	355 ↑
<i>B</i>	<b>proficient</b>	330 ↑
<i>BC</i>	<b>good</b>	310 ↑
<i>C</i>	<b>acceptable</b>	275 ↑
<i>D</i>	<b>mediocre</b>	240 ↑
<i>F</i>	<b>unacceptable</b>	0 ↑

You are encouraged to form study/problem groups with your classmates; things not clear to you may become obvious when you try to explain them to others or when you hear other points of view. Sometimes just verbalizing your mathematical thoughts can deepen your understanding. As already mentioned, if you discuss with others the exercises, each person should write up her/his own version of the solution.

**Calculator Policy:** It is acceptable to use calculators on exams to do arithmetic computations, but the computations are to be exact. So an answer which has  $\sqrt{2}$  in it is to be presented as such and not as 1.414.

**Attendance:** It is expected that each student will be present at all of the classes. Office hours are for students who need additional help beyond that given in the class; they are not substitutes for class.

**Note to McBurney Disability Resource Center students:** Students of the Center who are recommended for some accommodation (e.g., extended time on exams) should contact the instructor about this no later than September 16, 2005.

### Math 340 Exercises with due dates

**Each hand-in problem or exercise is worth 1 point. Since there are 91 problems and homework counts 85 points, you can still miss 6 problems and get the maximum points.**

- Thursday, January 26: Problems 1.6, 1.11 (2) and (3), 1.15, 1.25 (1), and Exercises 1.2, 1.3
- Thursday, February 2: Problems 1.28, and Exercises 1.4 (2), 1.7, 1.10, 1.12, 1.19 (A) and (C), 1.20, 1.23 (1), 1.26 (1) and (2), 1.26 (3) and (4)
- Thursday, February 9: Problems 2.10 (2), 2.13, 2.15 (2), and Exercises 2.4, 2.8 (2), 2.14, 2.16 (B), 2.19
- Thursday, February 16: Problems 3.4 (2), 3.5, 3.7, 3.9
- Thursday, February 23: Problems 3.14, 3.15, and Exercises 3.3, 3.6, 3.7, 3.10, 3.12
- Thursday, March 2: None this week because of Exam.
- Thursday March 9: Problems 3.17 (1), 3.17 (2), 3.19, 3.22, and Exercises 3.16 (1) and (2), 3.16 (3) and (4), 3.17, 3.19 (1), 3.21
- Thursday March 16: Spring Break
- Thursday March 23: Problems 4.2, 4.5, 4.7, 4.8, 4.12, 4.13, and Exercises 4.6, 4.7, 4.8 (3)
- Thursday March 30: Problems 4.18, 4.24, and Exercises 4.14, 4.17, 4.21, 4.22 (3), 4.24, 4.25
- Thursday April 6: Problems 5.2, 5.5
- Thursday April 13: None this week because of Exam.
- Thursday April 20: Problems 5.9, 5.11, 5.15, 5.18, 5.19, and Exercises 5.2, 5.3, 5.5
- Thursday April 27: Problems 5.22, 5.23, 5.26, 5.27, and Exercises 5.8, 5.9, 5.11 (3), 5.13, 5.14, 5.22, 5.23
- Thursday May 4 (last Class) Problems 6.5, 6.6, 6.9, and Exercises 6.1 (2) and (3), 6.3, 6.6, 6.7, 6.8, 6.9, 6.11, 6.17