Dennis Moore

Syllabus

Spring 2011

Course Information

Title	Matrix Algebra and its Applications
Number	MA 322, Section 401
Lecture	TR 6:00-7:15 pm, CB 341
Text	David C. Lay, *Linear Algebra and its Applications*, Third Edition www.laylinalgebra.com
Website	www.ms.uky.edu/~dmoore/ma322

Instructor Dennis Moore, dkmoor5@uky.edu; Office: 722 POT, 257-6807
Office Hours: TR 3-4:30 pm and by appointment

The best ways to contact me outside of class are during my scheduled office hours or via email. If my office hours are inconvenient, another time can be arranged.

Description This course will introduce students to the utility of matrices in scientific applications through basic concepts. Topics for the course include systems of linear equations, linear independence, linear transformations, algebra of matrices, triangular factorization, elementary theory of vector spaces, eigenvalues and eigenvectors, diagonalization, determinants, orthogonal projections, and least squares approximation. **Prerequisite** MA 114.

Outline There will be three exams (two midterms and a comprehensive final) and weekly homework assignments. Most of chapters 1 through 6 in the text will be covered. The first exam will cover chapters 1 and 2, the second exam will cover chapters 4 and 5, and chapters 3 and 6 will be covered before the final exam.

Grading Homework will account for thirty percent (30%) of the overall grade, the two midterms will each account for twenty percent (20%) of the grade, and the final exam will account for the remaining thirty percent (30%). Letter grades will follow a 90-80-70-60 scale: 90 percent of the points will earn an A, 80 a B, 70 a C, and 60 a D.

Exams Midterm exams will be given during the normal lecture period. Calculators (and cell phones and laptops) will be neither allowed nor necessary for exams. All exams will be cumulative, due to the nature of the material. **[Tentative] Schedule** First midterm: Thurs., Feb 17; Second midterm: Thurs., Mar 31; Final: Tues., May 3 6:00 pm.

If you are unable to take an exam because of a university excused absence, notify the instructor as soon as possible to make other arrangements.

Homework will be assigned regularly and collected weekly. Homework problems will be posted on the course website or announced in lecture (possibly both). You are expected to complete and submit full solutions for all assigned problems. Some problems will require careful justification. Late homework will not be accepted unless the student misses lecture for an excused absence. In this case, you must notify the instructor as soon as possible

(preferably beforehand) and submit the assignment within a week of the due date.

Problems will rarely be discussed during class. Be sure to start homework early to allow time to meet with others when necessary. Solutions to some of the problems will be discussed in class or posted online. Some of the assigned problems may not be graded.

Submitted work should be written neatly on loose-leaf paper in complete sentences where necessary, organized clearly, and **stapled** (if more than one page). Leave blank space for grading and comments. Points will be deducted otherwise!

Attendance Students are expected to attend lecture. Announcements will be made during class, which may not appear on the course website. If you must miss lecture, consult a classmate. Do not hesitate to ask questions during class.

Students engaging in disruptive behavior (such as working on unrelated material, using a cell phone or laptop, having conversations with other students, being disrespectful towards others) will be asked to leave.

Academic Integrity Students are encouraged to discuss problems together; however, all solutions should be written up individually. Students should **not** submit work which looks identical to the work of other students or the answers found in the back of the textbook and study guide. Communicating with other students (in any form) or using electronic devices during exams is forbidden. All instances of cheating will be dealt with according to University guidelines. At a minimum, a score of zero will be awarded to the offender(s) for the assignment in question.

Other Notes Do not hesitate to ask questions. Seek help early—many topics or ideas will be revisited throughout the semester. Get to know fellow students. Discuss problems with others, but be sure to spend time thinking about the problems by yourself. Check your work carefully as you attempt problems. Write everything as clearly as possible. Partial credit may be given for intelligible (but incorrect) answers. I welcome feedback about the course (lectures, homework, exams, website, etc) throughout the semester.

Most importantly, **READ THE TEXTBOOK** throughout the semester: skimming before class will make lectures easier to follow, reading after class will reinforce concepts and make studying much quicker and more rewarding.

Accommodations for Students with Disabilities If you have a documented disability that requires academic accommodations, please see me as soon as possible. In order to receive accommodations, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email jkarnes@email.uky.edu).

Important Dates Last day to add: Jan 19, Last day to drop: Feb 2,
Spring Break: Mar 14-18, Last day to withdraw: Apr 1, Last day of classes: Apr 29

For more information about these dates, see the Registrar's website (www.uky.edu/Registrar).

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Policy and Information

Instructor: H. C. Howard.
Office: POT 805; phone 859 · 257· 4874.
Office Hours: 10:30 am-12:30 pm, M, W, and F, and by appointment.

The text for this course is 'Nonlinear Ordinary Diffffferential Equations' (4ed.) by D. W. Jordan and P. Smith. The course will discuss selected sections and topics from Chapters 1-3, 8, 12, and 13. The course meets three times a week, Monday, Wednesday, and Friday at 1 pm, in Funkhouser 213.

There will be three 'hour' exams, in class, on February 9^{th}, March 9^{th}, April 13^{th} and a 'two hour' final exam on May 4^{th}, 2011. Each hour of examination is worth 100 points. Some homework (HW) will be collected each week for grading and prompt return to the student (there will be about 32 HW assignments in the course). An 'Instructor Grade' (IG) for each student, worth 100 points, will be determined by the student's modified HW average. A 'modified average' is defined as the (classical) average (of a set of numbers) divided by .95. Letter grades determined by the (standard) algorithm: student average $\geq 90 \Rightarrow$ A, $90 >$ student average $\geq 80 \Rightarrow$ B, etc. The definition for student average is: $(\sum_{i=1}^{i=5} \text{hour}_i \text{ exam score} + \text{IG})/6$.

The class average for each exam (and only each exam) shall be greater than or equal seventy (70), with student scores adjusted peremptorily, if necessary, to ensure this value holds. In any computation involving a 'class average', scores less than forty (40) will be omitted. Thus if in a class of 5 students there are scores of $38, 45, 67, 89$ and 92, then the 'class average' is $(45+67+89+92)/4 = 73.25$.

Late HW papers not accepted. It is suggested you save your HW papers, and exams until the end of the semester, for review purposes, and as evidence of their existence and scoring. The educational value of HW and exams is at least doubled if incorrect written work is redone until correct. See the instructor for suggestions and help on how to proceed efficaciously in this matter. Note the list of background concepts for this course on the back of this sheet. You should have at hand appropriate books/references for the items listed.

All rules and regulations in the current University of Kentucky Student Rights and Responsibilities handbook are in full force throughout this course. This handbook is available on line at:

http://www.uky.edu/StudentAffairs/Code/.

The student is responsible for anything said in class, and, during class, rendering temporarily inert any personal electronic communication devices.

H. C. Howard
Wednesday, January 12^{th}, 2011.

Ma 481G Background/Prerequisites/HW Format

You should be familiar with the following mathematical concepts and techniques:

1. Limits and continuous functions.
2. Ordinary and partial derivatives of a function.
3. Implicit functions and implicit differentiation.
4. Definition and properties of the Riemann integral.
5. The fundamental theorem of calculus.
6. Inverse functions.
7. The chain rule for functions of one or several variables.
8. Evaluation of line integrals in the plane.
9. Integration and differentiation of the 'elementary functions', and all trigonometric functions; integration of rational functions; integration by parts; integration by substitution.
10. Infinite series; Taylor and Maclaurin series.
11. Parametric equations.
12. Elementary linear algebra.

HW Format: If possible, please use 8.5 × 10 inch paper in writing up HW assignments. Also, please fold your sheet(s) the "long" way and, with the fold on the left, write you last name on the "outside" of the top sheet, as seen below (HW is always due at the start of class).