Course Syllabus

Course Information

Math 2333   Matrices, Vectors, and Their Application   Spring 2014

Professor Contact Information

Instructor: Dr. Paul Stanford
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Course Pre-requisites, Co-requisites, and/or Other Restrictions

Math 1314 or equivalent

Course Description

Students will learn concepts and elementary techniques of linear algebra related to systems of linear equations, matrices, determinants and vectors. They will use those techniques in solving appropriate applied problems.

Topics from chapter one will include matrices and their connection with systems of simultaneous linear equations, Gauss-Jordan elimination, Euclidean vector spaces, subspaces of $\mathbb{R}^n$, basis and dimension, some applications of the inner product for $\mathbb{R}^n$, curve fitting. Chapter two will cover the arithmetic and algebra of matrices and computing the multiplicative inverse of a matrix. Chapter three will include determinants and their computation, the application of determinants to matrix inverse and the solution of systems of linear equations, eigenvalues and eigenvectors. Chapter four covers subspaces, spanning sets and linear independence, properties of bases, and rank. Gaussian elimination and LU decomposition are covered in chapter seven. Lastly, linear programming problems and methods of solution are introduced in chapter eight.

Student Learning Objectives/Outcomes

1). Students will apply Gauss-Jordan method to solve a system of linear equations or to determine such that a solution does not exist.
2). Students will compute the determinant, inverse, and rank of a matrix, eigenvalues and eigenvectors as appropriate.
3). Students will demonstrate their understanding of the properties of operations on vectors. In particular, given a set of vectors in a space, they will be able to determine if the set forms a basis for that space.
4). Given a narrative description of a real-life problem, students will analyze the problem and relate it to relevant concepts from linear algebra and then use appropriate techniques to solve the original application problem.

Required Textbooks and Materials

Linear Algebra with Applications, 8th Edition, Gareth Williams, and an access code to WebAssign.
You can either buy the textbook bundled with the WebAssign access code, or you could buy each separately.
Student Solutions Manual is recommended.

Assignments & Academic Calendar

There will be two midterm examinations and a comprehensive final examination.

Midterm I   Tuesday, February 11, in class
Midterm II   Tuesday, March 25, in class
Final Exam   8:00-10:00pm, Monday, May 12, HH 2.402

Here is the schedule for selected problems which all students should do. The answers
to these problems are in the back of the text and examples of solutions are in the Solution Manual.

Week of 1/13   1.1: #1a, c, e, 2, 5a, c, e, 6a, d, f, h, 7a, c, e, 8a, c, 9a, c, 10a, c, e, 11a, c, d, 12a, b, d
                1.2: #1a, b, c, d, e, f, g, h, i, 2a, b, c, d, e, f, g, h, i, 3a, c, e, 4a, c, 5a, c, e, 6a, c, e, 7a
Week of 1/20   1.3: #5a, c, d, g, 6a, b, d, 7a, b, d, 8a, b, 9a, c, 10a, c, 11a, c, f,
                1.4: #1a, c, 2a, c, 3a, b, c, 4, 6, 8, 9
Week of 1/27   1.5: #1, 3a, c, 4a, c, 5a, c, 6a, b, c, d, e, f, 7a, b, c, d, e, f, 12, 13, 14, 15, 16, 17, 18
                1.7: #1, 2, 3
Week of 2/3   1.6: #1a, c, 2a, c, 3a, c, e, 5a, c, e, 6a, c, e, 7a, c, e, 8a, c, e, 9a, c, d, 10a, c, d, 11a, c, e,
                        12a, b, 13a, b, d, 14a, c, 15a, 16a, c, 17a, c, 18a, c, 19a, c, e, 20
                Review for the first midterm
Week of 2/10   Midterm 1
                2.1: #1a, c, g, 2a, d, f, 3a, d, e, g, 4a, d, f, h, 5a, c, e, g,
                        8a, c, e, g, 9a, b, d, e, g, 10a, c, 11a, c, 25a, c
Week of 2/17   2.2: #1a, c, 2, 4a, c, 5a, c, 6a, c, 7a, c, 12a, c, 13a, c, 15, 31a, 32a, b, 36, 38
                2.3: #1a, c, d, f, h, 2a, b, c, 3a, c, e, 9
Week of 2/24   2.4: #1a, c, 2a, c, 3a, c, e, 4a, c, 5a, c, *very important is 7a, c*, 8a, c, e, 9a, c, e, 13, 17, 19
                3.1: #1a, c, 2a, c, 3a, c, 4a, c, 5a, c, 6a, c, 7a, c(just use the cofactor expansion
                        method with #7), 8a, c, 9a, c, 10a, c, 11a, c, 12, 14, 16
Week of 3/3   3.2: #1a, c, 2a, c, 3a, c, 4a, c, 5, 6a, c, 7a, c, 8a, b, c, d, e, f, 9a, b, c, d, e, f, 10a, c,
                        12a, b, 13a, c
                3.3: #1a, c, 2a, c, 3a, c, 4a, c, 5a, c, 6a, c, 7a, c, 8a, c, 9a, b, 10a, c, 13a, c, 14a, c, 15
Week of 3/17   3.4: #1, 2, 4, 6, 8, 9, 10, 13, 17, 19
                Review for the second midterm
Week of 3/24   Midterm 2
                4.1: #18a, c, 19a, c, e, f, g, 20a, b, c, e, 21a, b, c, 22a, c, d
Week of 3/31   4.2: #1a, c, 2a, c, 3a, 4a, c, 5a, 6a
                4.3: #1a, c, e, 2a, c, 3a, c, 4a, b, 6a, b, c, d, 7a, c, 16a, b, c, d, 17a, b, c, d, e
Week of 4/7   4.4: #1a, c, 2a, c, 3a, b, c, d, 4a, c, 5a, b, c, d, 6a, b, c, d, e, f, g,
                        7, 8, 10, 12, 13, 15a, b, c, d, e, 16a, b, c, d, 32, 33
                4.5: #1a, c, 2a, c, e, 3a, c, 4a, c, 5a, b, 6a, c, 7a, 10a, b, c, d, 11a, b, c, d, e, f,
                        12a, 14a, 19
Week of 4/14   7.2: #1, 3, 4, 6, 7a, b, c, d, 8a, b, c, d, 9, 11, 14, 18
Week of 4/21   8.1: #1, 3, 5, 6, 8, 9, 11, 13
                8.2: #1, 2, 4, 6, 7, 10, 12, 15, 16
Week of 4/28   Review for the final examination

Grading Policy

Homework	15%
Midterm with lower grade	20%
Midterm with higher grade	30%
Comprehensive Final	35%

Course & Instructor Policies

The practice problems listed above are not collected. However, there will be graded computer based homework assignments on WebAssign. The examinations will contain problems entirely comparable in their essentials to these practice homework problems. Therefore when grading tests, it will be apparent who has done these problems and who has not. Makeup examinations will not be given except in extraordinary circumstances. If you know you will be missing an exam, notify your instructor *before* the test date.

Attendance: Highly recommended.
Citizenship: Any action that disturbs your classmates or interrupts the lecture is unacceptable.
Examples of such actions are:
(a) Entering the classroom late - be as punctual as possible.
(b) Leaving the classroom before break or before the end of lecture.
(c) Cell phones, ringers, buzzers, beepers, alarms, blackberries - turn them off unless you are a member of an emergency response team.
   An apology is expected from anyone creating such a disturbance.
Student participation in class is desired. However, please raise your hand to speak and avoid having side conversations with your classmates.

There will be no extra credit.

All letter grades will be assigned in accordance with the table of numeric to alphabetic conversions given below.

[90; 92) A-, [92; 97) A, [97; 100] A+,
[80; 82) B-, [82; 87) B, [87; 90) B+,
[70; 72) C-, [72; 77) C, [77; 80) C+,
[60; 62) D-, [62; 67) D, [67; 70) D+, [0; 60) F

Calculators: Students may use a scientific or arithmetic calculator but are not required to have a graphing calculator. No calculators with matrix and/or graphing features will be allowed during tests.

Official UTD Policies

http://coursebook.utdallas.edu/syllabus-policies/

These policies are considered to be a part of this syllabus.

These descriptions and timelines are subject to change at the discretion of the professor.