



<b>Course</b>	MATH 2333-521: Matrices, Vectors & Applications
<b>Professor</b>	Dr. Paul Stanford
<b>Term</b>	Summer 2007
<b>Meetings</b>	6:00 p.m.-7:50 p.m. TR in GR3.420

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### **Professor's Contact Information**

<b>Office Phone</b>	(972) 883-4143
<b>Other Phone</b>	(972) 883-2161 (math dept)
<b>Office Location</b>	ECSN 2.518
<b>Email Address</b>	paul.stanford@utdallas.edu
<b>Office Hours</b>	4:00 - 5:00 MTWR
<b>Other Information</b>	Prefer contact through WebCT6 mail
Teaching Assistant	Daniel Uribe in FO 1.604

### **General Course Information**

Pre-requisites, Co-requisites, & other restrictions

Prerequisite: MATH 1314 or equivalent.

Graphing calculators will NOT be allowed: only non-alpha display scientific calculators are permitted.

### **Course Description**

This is an introductory course in linear algebra with primary focus on theory and secondary focus on computational methods and applications in the physical and social sciences. Course Topics include matrices, vectors, determinants, matrix inverses, and systems of linear equations.

Chapter 1: Systems of Linear Equations (sections 1.1, 1.2, and 1.3).  
Chapter 2: Matrices (sections 2.1, 2.2, 2.3, 2.4, 2.6, and 2.7).  
Chapter 3: Determinants (sections 3.1, 3.2, 3.3, and 3.4).  
Chapter 4: Vector Spaces (sections 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, and 4.8).  
Chapter 6: Linear Transformations (section 6.1).  
Chapter 7: Inner Product Spaces (section 7.4).  
Chapter 8: Numerical Techniques (section 8.1).  
Chapter 9: Linear Programming (sections 9.1, and 9.2).

### **Learning Outcomes**

Students will learn concepts and techniques of linear algebra, including vector spaces, matrices, determinants, and linear transformations.

### **Learning Objectives**

- 1). Given a system of linear equations, students will be able to apply the Gauss-Jordan algorithm to determine all solutions, and determine whether the system is consistent and whether the solution is unique.
- 2). Given a narrative description of a application problem, students will be able to select an appropriate matrix or vector technique, model the situation, and use suitable techniques to obtain a solution to the original problem.
- 3). Given definitions of a set of objects with a well-defined addition and scalar multiplication, students will be able to evaluate whether this constitutes a Real vector Space.
- 4). Given a square matrix, students will be able to accurately calculate its determinant, and deduce whether the matrix is invertible or singular.

**Required Texts & Materials**      Linear Algebra with Applications, fifth edition, by Gareth Williams.

**Suggested Texts, Readings, & Materials**      Student Solutions Manual is strongly recommended.

### **Assignments & Academic Calendar**

[Topics, Reading Assignments, Due Dates, Exam Dates]

May 15	First day
May 28	Memorial Day
May 31	Exam I
June 21	Exam II

July 4 Independence Day

July 24 Last Day (review)

**Thursday, July 26 at 6:00pm      Final Exam**

## **Course Policies**

### **Grading (credit) Criteria**

Each quiz is worth 25 points. The lowest two quiz scores will be dropped. The remaining quizzes are counted and converted to a percentage, giving a possible total of 100 points. Each regular examination is also worth 100 points. Only the best two scores from the quiz total or the regular exams will be used in the grade calculation, giving a possible total of 200 points. (In other words, the lowest of the three scores is dropped.) The comprehensive final examination is worth 200 points. This score cannot be dropped.

These scores are weighted so that the best two of three scores contribute 60% towards the overall grade, and the final contributes 40% toward the overall grade.

Grade Scale: [97,100] A+, [93,97) A, [90,93) A-, [87,90) B+, [83,87) B, [80,83) B-, [77,80) C+, [73,77) C, [70,73) C-, [67,70) D+, [63,67) D, [60,63) D-, [ 0, 60) F

Midterm grades will be computed and submitted to the records office when requested. This grade will be computed in the following manner: Average of all quizzes up to this time (no drops) 50%. Average of all exams up to this time (no drops) 50%.

Make-up Exams      NO MAKE-UPS except in extraordinary circumstances. Missed exams are a zero.

Extra Credit      n/a

Late Work      All students are expected to take the examinations at the announced time.

### **Special Assignments**

Problems will be assigned on a regular basis. Problems in the text marked with an asterisk have solutions in the appendix. Complete solutions to many of these problems may be found in the Solutions Manual, which is on reserve at the library (and may be available in the bookstore). The assignments are intended to supply adequate practice for mastery of the concepts presented in each section. You should work several problems of each type, and working more than the class assignments is strongly encouraged. If you feel the assigned problems are inadequate, select additional problems of like kind and work them as well. Assignments will not be collected. However, the weekly quizzes may contain problems taken directly from the assigned homework problems. Do not use the

solutions at the back of the textbook before you have exhausted all possibilities (including asking the TA and the instructor).

## Homework Assignments

In order to succeed in this course, one must work a large number of problems. Here is the list of selected exercises which everyone is expected to do. Many students might find it necessary to have more practice; they should choose similar problems from each section, or from the review exercises or practice tests, which can be found at the end of each chapter.

Sec 1.1 #1,2,3,4,5a,c,e,6b,d,f,h,7,8a,b,c,10a,c,e,12b,e,13a,b,c

Sec 1.2 #1,2,3,4,5a,e,6a,7d,e,8e,g,10a,11a,12,13

Sec 1.3 #1,4,5,6 (no electric circuits or traffic flow)

Sec 2.1 #1,2,4,5a,6,7b,9,10a,c,12,a,b,16,25 (no partitioning)

Sec 2.2 #1,2,4,5a,b,d,6,8,11a,b,c,14,18a,c,19a,b,20a,b,23,24,27,28

Sec 2.3 #1a,d,e,f,g,i,2,a,b,c,6,9,10,11a,15b,c (no complex or seriation)

Sec 2.4 #1,a,b,2,b,c,3a,c,e,4a,d,5c,d,6c,8a,c,11,13,15,17,18,21,24

Sec 2.6 #1,4,5,6,7,11,13

Sec 2.7 #1a,b,2b,3a,b,d,4,5,8a,b,e,13a,d,14a,17,23

Sec 3.1 #1,2,3a,c,d,5a,c,7,a,c,8b,c,9c,d,11a,b,c,12,13,14,17

Sec 3.2 #2a,b,4a,b,5,6a,b,7a,b,8,9,10a,b,d,12,16,19

Sec 3.3 #1,2a,b,4a,b,5a,b,6a,7a,b,8,9,10,11,12a

Sec 3.4 #1,2a,b,4a,b,5a,b,6a,7a,b,8,9,10,11,12a

Sec 4.1 #1,3a,b,5a,d,g,6,7a,b,d,9b,d,10a,b,c

Sec 4.2 #1a,3a,c,e,4c,d,5a,d,6e,7a,b,c,e,8c,e,10,13a,d,16,19a,e,24,28

Sec 4.3 #1,2a,5,16

Sec 4.4 #1a,b,2a,d,3a,c,5,6a,c,7a,b,c,8,12a,b,c matrices

Sec 4.5 #1a,c,2a,b,3a,d,6b,c,8a,c,9a,c,10,13,17,22a

Sec 4.6 #1a,b,2a,c,3a,4a,b,e,5a,b,6a,b,c,7a,b,c,(note 9)

Sec 4.7 #1a,2a,3a,d,5a,b,c,6,10,12,13,15a,b,c,d,21,31,32a,b,c

Sec 4.8 #1c,d,2a,c,d,3a,b,4c,5a,b,6a,c,7a,c,9,12,14a

Sec 6.1 #1,2,3,4,5,6,7,10,12,15a,b,16,18

Sec 7.4 #1,3,6,8,9,11,15,21,26,28

Sec 8.1 #1,2,3,5,6

Sec 9.1 #1,2,6,12,13,16 (for 1,2&16, draw graphs)

Sec 9.2 #1,2,12,13

**Class Attendance**

Classroom attendance is required.

**Classroom Citizenship**

Professional behavior is expected. Please be punctual and ensure that your electronic communication devices are turned off. Announcements are generally made at the beginning of class. If you miss class or arrive late, it is your responsibility to acquire any missed notes or announcements. Student participation in class is desired. However, please raise your hand to speak and avoid side conversations with your classmates. Behavior that infringes on the learning experience of your classmates will not be tolerated.

Cheating, in any form constitutes an infraction of the academic integrity code and will be dealt with according to university disciplinary procedures.

**Field Trip Policies**

n/a

**Student Conduct and Discipline**

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, A to Z Guide, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3, and in Title V, Rules on Student Services and Activities of the university's Handbook of Operating Procedures. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

**Academic Integrity**

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for

details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

### **Email Use**

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

### **Withdrawal from Class**

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

### **Student Grievance Procedures**

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's Handbook of Operating Procedures.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the dean will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

### **Incomplete Grades**

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of F.

### **Disability Services**

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office

hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:

The University of Texas at Dallas, SU 22  
PO Box 830688  
Richardson, Texas 75083-0688  
(972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

### **Religious Holy Days**

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

### **Off-Campus Instruction and Course Activities**

Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at [http://www.utdallas.edu/BusinessAffairs/Travel\\_Risk\\_Activities.htm](http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm). Additional information is available from the office of the school dean.

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