

MATH 2418.13F: Linear Algebra

Section: MATH 2418.001

Class Time: Tues & Thurs: 1:00pm-2:15pm

Class Location: JO 3.516

Instructor: Dr. Wieslaw Krawcewicz

Office: Founders Building 2.602F

Office hours: Tues & Thurs: 5:30pm-7:00pm

Telephone: (972) 883 6620

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Section: MATH 2418.002

Class Time: Tues & Thurs: 2:30pm-3:45pm

Class Location: GR 3.420

Instructor: Dr. Qingwen Hu

Office: Founders Building 2.610E

Office hours: MW: 2:30pm – 4:30pm

Telephone: (972) 883 6599

E-mail: qingwen@utdallas.edu

Textbook and Reference

Howard Anton, *Elementary Linear Algebra*, Wiley 10th Edition, ISBN: 9780470458211 (Main Book), ISBN: 9780470432051 (Application Version). Textbook and Student solutions manual are recommended.

Co-requisites

Students must enroll in one of the problem sessions.

Course Websites

The instructors will post important announcements through the course homepage at eLearning. The website of eLearning is <https://elearning.utdallas.edu>. At the course homepage, there will be two links to WeBWork online homework system which are valid from the internet off-campus and on-campus, respectively. To access WeBWork from off-campus internet, one needs to log on the VPN (Virtual Personal Network) of UTD with the NetID and password.

To access the WeBWork site off-campus:

- 1) On the eLearning course homepage, click “WeBWork access (Off-campus)”

- 2) Enter your regular UTD username (NetID) and password
- 3) In the blank at the top right corner, next to “browse”, type “http://euler.utdallas.edu/webwork2”
- 4) Click “browse”
- 5) Click the course “A-MATH2418-FALL2013”
- 6) Enter the username and password you obtained from eLearning under “My Grades.”

To access WeBWork on campus:

- 1) On the eLearning course homepage, click “WeBWork access (On-campus)”
- 2) Click the course “A-MATH2418-FALL2013”
- 3) Enter the username and password you obtained from eLearning under “My Grades.”

On the WeBWork course homepage, at the top, you will see links to the homework assignments, along with their due dates. The user name to log on WebWork will be shown on eLearning as your alias (Please try to find it). The temporary password is the same as your alias. Please modify after the first logon.

Materials to Cover

We will cover the following sections of the textbook.

Chapter 1: Systems of Linear Equations and Matrices (1.1, 1.2, 1.3, 1.4, 1.5, 1.6 and 1.7)

Chapter 2: Determinants (2.1, 2.2, and 2.3).

Chapter 3: Euclidean Vector Spaces (3.1, 3.2, 3.3, 3.4 and 3.5).

Chapter 4: General Vector Spaces (4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9 and 4.10).

Chapter 5: Eigenvalues and Eigenvectors (5.1, 5.2, and 5.3).

Chapter 6: Inner Product Spaces (6.1, 6.2, 6.3 and 6.4).

Chapter 7: Diagonalization and Quadratic Forms (7.1, 7.2 and 7.3).

Chapter 8: Linear Transformations (8.1, 8.2, 8.3, 8.4 and 8.5) as time permits.

Course Description and Objectives

Students will learn concepts and techniques of linear algebra. Course topics include systems of linear equations, determinants, vectors and vector spaces, linear transformations, eigenvalues and eigenvectors, and quadratic form.

- 1) Given a system of linear equations, students will be able to apply the Gauss-Jordon algorithm to determine all solutions, and determine whether the system is consistent and whether the solution is unique.

- 2) 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. If valid, students will be able to demonstrate each axiom; if invalid, students will be able to present and verify an explicit counter-example to a vector space property.
- 3) Given a square matrix, students will be able to accurately calculate its determinant, and deduce whether the matrix is invertible or singular.
- 4) Given an explicit matrix, students will be able to determine its eigenvalues, and for each such eigenvalue students will be able to create a basis for the corresponding eigenspace.
- 5) Given a matrix, students will be able to accurately determine basis vectors for its row space, column space and null space.
- 6) Students will be able to use the Gram-Schmidt process to construct an orthogonal basis for an inner product space.
- 7) Students will be able to calculate the QR-decomposition of an invertible matrix.

Course Policy & Grading Scheme

Assignments: There will be about eight mandatory weekly assignments posted on WeB-Work. Students' responses for the most part must be typed in to the program and will be graded immediately. There will be *no late graded homework assignments* scores. Assignments will contribute 10% to the final grade.

Homework problems may be considerably more difficult and time consuming than exam problems. The point of homework is to increase the understanding of the material not simply to prepare students for exams. The lengthy list of suggested exercises from the book provide ample drill and practice. To be prepared for exams students should work through as many of the suggested problems as one needs in order to become comfortable with the material and the mechanics of problem solving.

Quizzes: There are weekly quizzes taken in the problem sessions. Quizzes will be administered weekly and will cover material up to and including material presented in lecture on the Wednesday preceding the quiz. The quizzes will be taken at the end of the problem session and will be graded by the TAs and returned in the following problem session. Quizzes will contribute 15% to the final grade.

Class Participation: MATH 2418 will be using pop-up quizzes or attendance sheet to enforce an active participation of all students enrolled in this course. The participation will contribute *five marks* on top of the final grade.

Exams: There will be two in class midterms exams (20% each) and a comprehensive final exam (35%). **Grading scheme:** It is critical for students to understand that this is a mathematics class and thus assessment is fairly clear-cut. Students must be able to work problems related to the material covered, otherwise students will not pass the class. There will be no

passing just for participation, in the final analysis students have to perform the mathematics adequately. *There will be no curving of the final grades.*

Two midterm exams: 20% each
Weekly assignments: 10%
Weekly quizzes: 15%
Final exam: 35%

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

[90; 93) A-, [93; 97) A, [97; 100⁺] A+
[80; 83) B-, [83; 87) B, [87;90) B+
[70; 73) C-, [73; 77) C, [77;80) C+
[60; 63) D-, [63; 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. Programmable calculators with matrix and/or graphing features will NOT be allowed during tests and exams.

Important Dates

August 26, Fall 2013: Classes begin
Sep 2, Fall 2013: University Closing: Labor Day
Sep 11, Wednesday, Fall 2013: Census Day
Sep 11, Wednesday, Fall 2013: Last day to drop a class without a "W" Full-Term Session
Sep 26, Thursday, Fall 2013: **Midterm Exam I**, in class
Nov 7, Thursday, Fall 2013: **Midterm Exam II**, in class
Nov 28 Thursday – Nov 3 Saturday, Fall 2013: University Closings: Thanksgiving Holiday
Dec 11, Wednesday, Fall 2013: Last Day of Classes Full-Term Session
Dec 12, Thursday, Fall 2013: Reading Days (Study days prior to final exams) Full-Term Session
Final Exam: Final exam date will be available in the Comet Calendar

Technical Support

If you experience any problems with your UTD account you may send an email to:

assist@utdallas.edu or call the UTD Helpdesk at 972 883-2911.

Field Trip Policies 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 the website address <http://www.utdallas.edu/businessaffairs/risk/travel.php5>. Additional information is available from the office of the school dean. Below is a description of any travel and/or risk-related activity associated with this course.

Student Conduct & 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 printed 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, Series 50000, Board of Regents, The University of Texas System, 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) and online at <http://www.utdallas.edu/judicialaffairs/UTDJudicialAffairs-HOPV.html>. 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, any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. 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 plagia-

ism (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.

Copyright Notice

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials, including music and software. Copying, displaying, reproducing, or distributing copyrighted works may infringe the copyright owners rights and such infringement is subject to appropriate disciplinary action as well as criminal penalties provided by federal law. Usage of such material is only appropriate when that usage constitutes "fair use" under the Copyright Act. As a UT Dallas student, you are required to follow the institutions copyright policy (Policy Memorandum 84-I.3-46). For more information about the fair use exemption, see the following website for details. <http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm>

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 students 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 respondents 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 Deans 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 Grade Policy

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semesters 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)
disabilityservice@utdallas.edu

If you anticipate issues related to the format or requirements of this course, please meet with the Coordinator of Disability Services. The Coordinator is available to discuss ways to ensure your full participation in the course. If you determine that formal, disability-related accommodations are necessary, it is very important that you be registered with Disability Services to notify them of your eligibility for reasonable accommodations. Disability Services can then plan how best to coordinate your accommodations.

It is the students 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.

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