MATH 3330-003: Introduction to Matrices & Linear Algebra, Fall 2015

Instructor	Richard Chandler	**Email**	richardc@UTA.edu
Office	PKH 463	**Website**	students.uta.edu/rg/rgc7061
Phone	817-272-0008 (Office) 817-272-3261 (Math Office)	**Office Hours**	Mon, Wed 3p – 3:50p, 5:30p – 7p
		Class Times	Mon, Wed 4p – 5:20p in PKH 103

Textbook *Linear Algebra with Applications, 5th Edition.* By Otto Bretscher, Prentice Hall.

Prerequisites A grade of C or better in MATH 1426 (Calculus 1). MATH 2425 (Calculus 2) is strongly encouraged.

Course Description Solving systems of linear equations, matrix operations, determinants, vector spaces, linear transformation, orthogonality, Gram-Schmidt process, projections, and eigenvalues and eigenvectors.

Learning Outcomes Upon completing this course, students should be able to:

1. Solve systems of linear equations and interpret the results geometrically;
2. Give the geometric meaning of linear transformations & express them in different coordinate systems;
3. Calculate the kernel, range, determinant, eigenvectors and eigenvalues of a linear map;
4. Identify a basis of a vector space;
5. Solve problems using orthogonal projection and orthonormal bases; and,
6. Justify and explain their steps in problem solving; in particular, students should be able to construct correct and detailed mathematical arguments to justify their claimed solutions to problems.

Grading Scale **A:** 100 - 90 **B:** 89 - 80 **C:** 79 - 70 **D:** 69 - 60 **F:** 59 and Below

Grade Components

Test 1 (September 30th) 20%
Test 2 (October 28th) 20%
Test 3 (November 23rd) 20%
Final Exam (Wednesday, December 16th, 2p – 4:30p) 40%

Tests & Final Exam Tests are administered during regular class time. The final exam will follow the university exam schedule. The final exam is comprehensive. The format of each exam will be a mix of multiple-choice problems and free-response problems. Your Final Exam grade may replace your lowest POSITIVE test grade. Test grades of a 0 resulting from poor performance or absence will not be automatically replaced.

Missed Test Policy There are no make-up exams for missed tests. Should you miss a test, you must contact me immediately. Each situation will be handled individually. Students missing an exam for an "approved reason" WITH DOCUMENTATION will be accommodated. Failure to contact me in a timely manner, providing no documentation or missing for an "unapproved reason" may result in the grade of 0 standing.

Calculator The use of any calculator or other electronic device will not be allowed in this class. Tests will be written in such a way that a calculator will not be necessary.

Homework A list of homework problems is attached with the tentative course schedule. These problems WILL NOT be collected. However, you are responsible for completing these problems. The problems of the test are modelled after those on the homework so it is in your best interest to complete these problems before the day of the test.

Attendance

Attendance will be taken every day. You are responsible for any and all announcements made in class and on the course website. You are responsible for any and all material missed during class. **Good participation and attendance will help your course grade if your course grade is borderline.**

Student Support

UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Drop Policy

Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/). Any student who drops this course on or before Wednesday, November 4th at 4 PM will receive a W.

Email Policy

UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.T

ADA

The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Student responsibility primarily rests with informing faculty **at the beginning of the semester and in providing authorized documentation through designated administrative channels.** If you require an accommodation based on disability, I would like to meet with you in the privacy of my office, during the first week of the semester, to make sure you are appropriately accommodated.

Academic Integrity

Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Student Feedback

At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory" shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week

A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exits

Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located at the corner of the building. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Title IX

The University of Texas at Arlington is committed to upholding U.S. Federal Law "Title IX" such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

Important Dates

First Day of Class ..... August 31st
Labor Day Holiday ..... September 7th
Census Date ..... September 14th
Test 1 ..... September 30th
Test 2 ..... October 28th
Drop Date ..... November 4th
Test 3 ..... November 23rd
Last Day of Class ..... December 9th
Final Exam (2:00p – 4:30p) ..... December 16th

Tentative Class Schedule & Assignment Sheet

"I reserve the right to adjust this schedule in any way that serves the educational needs of the students in this course." – Richard Chandler

Date	Section	Homework Problems
8/31	1.1 Introduction to Linear Systems	2, 11 – 13, 16, 17, 19, 22, 26, 31, 33, 38, 45, 46, 50
9/2	1.2 Matrices, Vectors & Gauss-Jordan Elimination	1 -4, 6, 8, 18, 21, 26, 27, 31, 43, 47, 48, 63
9/9	1.3 On the Solutions of Linear Systems; Matrix Algebra	1 – 7, 9 – 20, 25, 27, 28, 34, 36, 57 - 59
9/14	2.1 Intro to Linear Transformations and Their Inverses	1 – 6, 8 – 12, 14, 15, 17, 35, 57
9/16	2.2 Linear Transformations in Geometry	1, 2, 8 – 11, 26(a), 27, 30
9/21	2.3 Matrix Products	1 – 5, 7, 10, 11, 35, 43, 44, 20, 22, 26, 57, 58, 61
9/23	2.4 The Inverse of a Linear Transformation	1, 2, 5, 6, 10, 13, 16, 17, 19, 29, 30, 35, 37, 40
	---------- End Test 1 Material ----------	
9/28	3.1 Image & Kernel of a Linear Transformation	1 – 8, 12, 14 – 17, 19, 22, 30, 32 – 34, 44
9/30	**Test 1 (Chapters 1 & 2)**	
10/5	3.2 Subspaces of R^n; Bases & Linear Independence	1 – 3, 5, 8 – 16, 21, 24, 27, 28, 34, 48, 49
10/7	3.3 The Dimension of a Subspace of R^n	12, 13, 16, 17, 19 – 21, 26, 28, 29, 30, 36, 38, 39, 82, 83
10/12	3.4 Coordinates	3, 7, 12, 16, 17, 19, 21, 27, 43 – 45, 48, 59, 60
10/14	4.1 Intro to Linear Spaces	1 – 4, 7, 8, 20 – 22, 25, 26, 29, 30, 33
10/19	4.2 Linear Transformations & Isomorphisms	1, 3, 7, 9, 11, 17, 19, 22, 23, 42 – 44, 60
10/21	4.3 The Matrix of a Linear Transformation	15, 16, 21, 23, 24, 29, 32, 33, 46, 48, 57, 60(a)(b), 61(b)
	---------- End Test 2 Material ----------	
10/26	5.1 Orthogonal Projections & Orthonormal Bases	1 – 3, 10, 15 – 17, 29
10/28	**Test 2 (Chapters 3 & 4)**	
11/2	5.2 Gram-Schmidt Process	1, 5, 7, 33, 55
11/4	5.3 Orthogonal Transformations & Matrices	1 – 9, 13 – 18, 21 – 24, 35 – 38, 52, 57, 61
11/9	6.1 Intro to Determinants	1, 2, 5, 6, 9, 10, 12, 14, 15, 17, 19, 21, 22, 25, 29, 32 – 34, 45
11/11	6.2 Properties of Determinants	1, 5, 6, 11 – 17, 27, 35, 38 – 40, 45, 46
11/16	6.3 Geometrical Interpretations of Determinants; Cramer's Rule	22 – 24, 31, 33
	---------- End Test 3 Material ----------	
11/18	7.1 Diagonalization	1 – 5, 8, 9, 13, 24 – 29, 34, 38, 46, 47, 51, 67, 69
11/23	**Test 3 (Chapters 5 & 6)**	
11/25	Overflow Day	
11/30	7.2 Finding Eigenvalues of a Matrix	9 – 12, 15, 29, 32, 45
12/2	7.3 Finding the Eigenvectors of a Matrix	5, 6, 9, 10, 13, 15, 17, 18, 35, 36
	---End Course Material---	
12/7	Review for Final Exam	
12/9	Review for Final Exam	
12/16	**Final Exam (2:00p – 4:30p) (Comprehensive)**	