University of Connecticut
Math 2210Q-006/011, Applied Linear Algebra, Fall 2019

Instructor Information

Instructor: Noah Hughes
Webpage: http://personal.math.uconn.edu/~hughes/
Email: noah.hughes@uconn.edu (Expect responses only between the hours of 9am and 5pm.)
Office: Monteith, Room 322
Office Hours: Mondays from 3:30 - 5 pm, Wednesdays from 11:00 - 12:15am, and by appointment.

Course Description and Requirements

"Linear algebra is central to almost all areas of mathematics." This statement does well to explain why we study linear algebra: if you intend to use mathematics in some context, chances are that linear algebra will assist you in this endeavor. In the most basic terms, linear algebra is the mathematics of linear equations, linear functions and their representations. These tools provide a model for many natural phenomena, or at the very least, an approximation with great computational efficiency. Towards understanding linear algebra this semester we will study the fundamental concepts of the matrix and the vector space.

To do this, we will cover the majority of chapter 1 and roughly half of chapters 2 through 6 of the text. A detailed and tentative schedule is listed below.

From the department: Systems of equations, matrices, determinants, linear transformations on vector spaces, characteristic values and vectors, from a computational point of view. The course is an introduction to the techniques of linear algebra with elementary applications.

Text: *Linear Algebra and it's Applications* 5th ed., by David C. Lay
Prerequisites: MATH 1132Q, 1152Q or 2142Q. Recommended preparation: A grade of C- or better in MATH 1132Q. Not open for credit to students who have passed MATH 2144Q or 3210.
Calculators: You are welcome to use calculators while working on homework. They will *not* be allowed during exams or quizzes.

Assessments

Written homework: (worth 15% of your grade)

You will have weekly assignments posted on the homework section of the course webpage. These will consist of several problems taken from the suggested exercises at the end of each section. There will be an assignment for all sections covered in the course. The availability and submission deadlines for each assignment will be roughly as follows:

- Availability: The assignments pertaining to material in a given week will be made available by Sunday night of that week.
- Due dates: The assignment for a section will be due on the Wednesday of the week following the one in which the section was covered in class.

These are set so that you will have ample time to visit me in office hours before an assignment is due. Each section's homework will be graded as follows: 5 points will be given if all problems are completed, and 0 points will be given otherwise. In addition, depending on the length of the assignment, one or more problems will be graded for correctness and lucidity based on the following rubric:

5 points: The solution is correct and presented in a neat manner which is easy to follow.

4 points: The solution is correct but messy or hard to follow. *Or*, the work is neat and mostly correct but a mistake is present.

3 points: Significant progress was made towards a complete solution by demonstrating the techniques and ideas needed thought a complete solution was not given.

2 points: Multiple mistakes are present but you made significant progress towards a complete solution.

1 point: You have demonstrated that you have an idea of what is needed to be done but can not make significant progress towards a solution.

0 points: You did not attempt the problem or can not demonstrate an understanding of what is needed to find a complete solution.

In-Class Quizzes: (worth 15% of your final grade)

A quiz will be given at the end of class every Wednesday. Each will consist of a few problems from the previous week's material and should take between 10 and 20 minutes to complete.

These will be graded in two stages. Your quizzes will be returned to you on the next Friday with each question graded correct or incorrect. You will have until

the following Monday to turn in corrections for partial credit. Your corrections will also be graded as completely correct or not and returned on the following Wednesday.

Exams:

There will be three exams in total:

- Exam I (Friday, October 11, worth 20% of your final grade)
- Exam II (Friday, November 8, worth 20% of your final grade)
- Final exam (TBA, cumulative, worth 30% of your final grade)

Make-Up Work

Unexcused absence during exams or quizzes will be tolerated only in highly unusual documented circumstances (e.g., hospitalization). You may arrange with me well in advance if accommodations are needed. Late work will not be accepted, though you may always turn your work in early.

If you do miss a class, consult the online schedule to see what you missed.

Tentative Schedule

A tentative outline for the course can be found on the following page.

Academic Integrity

Integrity is a vital to a successful and rewarding academic experience. You are expected to observe the University's Academic Integrity Policy while participating in this course. Academic misconduct of any sort is subject to the consequences outlined therein. More information can be found at the Office of Community Standards.

Special Accommodations

Student athletes and students with disabilities should inform me of their commitments as an athlete, or any special needs that they have, etc. within the first three weeks of the semester. A letter from the Athletics Department or the Center for Students with Disabilities will be required for accommodations to be given. For more information on academic accommodations (including religious observances) visit the University of Connecticut Policy & Procedures website.

Disclaimer

I reserve the right to make changes to this document in partiality or entirety at any point during the semester.

Week	Objectives
1 8/26 -- 8/30	Material: 1.1 Systems of Linear Equations 1.2 Row Reduction and Echelon Forms Quiz: n/a
2 9/2 -- 9/6	Material: 1.3 Vector Equations 1.4 The Matrix Equation Ax = b Quiz 1: 1.1 and 1.2
3 9/9 -- 9/13	Material: 1.5 Solution Sets of Linear Systems 1.7 Linear Independence Quiz 2: 1.3 and 1.4
4 9/16 -- 9/20	Material: 1.8 Introduction to Linear Transformations 1.9 The Matrix of a Linear Transformation Quiz 3: 1.5 and 1.7
5 9/23 -- 9/27	Material: 2.1 Matrix Operations 2.2 The Inverse of a Matrix Quiz 4: 1.8 and 1.9
6 9/30 -- 10/4	Material: 2.3 Characterizations of Invertible Matrices 2.5 Matrix Factorizations Quiz 5: 2.1 and 2.2
7 10/7 -- 10/11	Material: 3.1 Introduction to Determinants 3.2 Properties of Determinants **Exam I:** Chapters 1 and 2
8 10/14 -- 10/18	Material: 3.3 Cramer's Rule, Volume, and Linear Trans Quiz 6: 3.1 and 3.2
9 10/21 -- 10/25	Material: 4.1 Vector Spaces and Subspaces 4.2 Nul(A), Col(A), and Linear Transformations Quiz 7: 3.1, 3.2, and 3.3
10 10/28 -- 11/1	Material: 4.3 Linearly Independent Sets; Bases 4.4 Coordinate Systems Quiz 8: 4.1 and 4.2
11 11/4 -- 11/8	Material: 5.1 Eigenvectors and Eigenvalues 5.2 The Characteristic Equation **Exam II:** Chapters 3 and 4
12 11/11 -- 11/15	Material: 5.3 Diagonalization 5.4 Eigenvectors and Linear Transformations Quiz 9: 5.1 and 5.2
13 11/18 -- 11/22	Material: 6.1 Inner Product, Length, and Orthogonality 6.2 Orthogonal Sets Fall recess Quiz 10: 4.3 and 5.4
14 11/25 -- 11/29	Fall recess.
15 12/2 -- 12/6	Material: 6.3 Orthogonal Projections 6.4 The Gram–Schmidt Process Quiz: n/a