MATH 2210: Applied Linear Algebra

Spring 2024

I General Information

Prerequisites

MATH 1132Q or 1152Q or 2142Q. Recommended preparation: a grade of C- or better in MATH 1132Q. May not be taken out of sequence after passing MATH 2144Q, 3210, 3510, or 3710. Repeat restrictions apply. See advising.uconn.edu/repeat-policy for information.

Credits and Time Commitment

This is a 3-credit course and you should expect to dedicate between 9 and 12 hours a week to it.[1]

Contact Information

Instructor: Gregory Michajlyszyn (he/him/his)

Email: gregory.michajlyszyn@uconn.edu

Office Hours: see HuskyCT

Course Motto

If you get lost, get found!

Communication

It is the student's responsibility to have access to, and regularly check, their UConn email address. Announcements and important course information will be sent out via official University email and through HuskyCT. Please click here to confirm that you have access to and will regularly check your University email.

If you need to contact the instructor, please email them at the email address listed in the Contact Information section and allow 24 hours for a response. **Be sure to email the instructor from your *UConn* email.**

Caution: do not send the instructor a message through HuskyCT!

[1] This expectation is based on the various course activities, assignments, and assessments, as well as the University's policy regarding credit hours.

Course Description

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.

Course Objectives

The goal for the semester is to learn, understand and be able to work with the main ideas of linear algebra, including:

- Systems of linear equations
- Matrices
- Vector spaces (concrete and abstract) and their bases
- Linear transformations and change of basis matrices
- Eigenvectors and eigenvalues
- Various matrix decompositions

and the applications of these ideas. This means that you should not only be able to work through a bunch of problems similar to ones seen in the homework, but also that you should have the ability to articulate the ideas presented in the course in a clear and coherent manner as well. You should be able to apply the theory in new and imaginative ways. This course will have concrete **and** abstract components. Being able to explain why something is true or false will constitute a significant part of the course.

Course Outline

- Chapter 1: 1.1-1.5, 1.7-1.9
- Chapter 2: 2.1-2.3, 2.5
- Chapter 3: 3.1-3.3
- Chapter 4: 4.1-4.6
- Chapter 5: 5.1-5.5
- Chapter 6: 6.1-6.4
- Chapter 7: 7.1-7.2
- Chapter 9: 9.1-9.3 (time permitting)

Textbook

The textbook for this course is Linear Algebra and Its Applications by Lay, et al. It comes with an access code to online homework on MyLab Math.

II Grading

I will make every effort to provide feedback and grades within one week. To keep track of your performance in the course, refer to My Grades in HuskyCT.

Final grades for this course will be computed in according to the table below.

Category	Weight
Online homework	10%
Quizzes	15%
Exam 1 + Written HW1	20%(E1) + 5%(HW1) or* 25%(E1)
Exam 2 + Written HW2	20%(E2) + 5%(HW2) or* 25%(E2)
Final Exam + Written HW3	20%(FE) + 5%(HW3) or* 25%(FE)

*Whichever is greater.

The purpose of this is to give you more control in the type of course YOU want. If you don't want to do a homework, more weight is given to the corresponding exam.

Exam replacement policy: Your final exam score (in percent) will automatically replace your lowest midterm score (in percent) if it is in your benefit and it will be replaced *before* finding the corresponding block's weight.

Online Homework

There will be online homework (MyLab) corresponding to (almost) every section we cover, which **must** be accessed through HuskyCT. Due dates for online homework are found directly in MyLab.

Written Homework

Worksheets are graded for completion. Late submissions are not accepted. Written homeworks are due the day of the corresponding exam and solutions will be released roughly one week before the corresponding exam.

Mastery Quizzes

There will be quizzes given on 10 of the main topics covered in the class, listed below. These quizzes will be given once a week at the beginning of class. You will have multiple chances to take quizzes on each of the topics. They are graded as correct or incorrect. If you get it correct, you will receive full credit on that quiz and **do not** need to retake it. If it is incorrect, you must retake a quiz on that topic to receive credit. You do not need to complete the topics in order but quizzes will only be given after that topic is covered in class.

- Row Reduction
- Inverse of Matrix
- Vector Spaces
- Bases and Transformations
- Diagonalization
- Pivots
- Determinants
- Null and Column Space
- Eigenvalues and Eigenvectors
- Projections and Gram-Schmidt

Exams

There are two midterms and a final exam (cumulative) in this course. The topics each exam will cover is listed below:

Exam	Date	Sections Covered
Exam 1	Thursday, February 22$^{\text{nd}}$**	1.1-1.5, 1.7-1.9, 2.1-2.3
Exam 2	Thursday, April 4$^{\text{th}}$	2.5, 3.1-3.3, 4.1-4.6, 5.1-5.5
Final Exam	TBD	Cumulative

Exam 1 was moved from the 15$^{\text{th}}$ due to cancelled class.

Any academic integrity violation related to an exam will result in a grade of 0 on that exam and a referral to the disciplinary board.

Grading Scale

A	[93, 100]	**B**	[83, 87)	**C**	[73, 77)	**D**	[63, 67)
A-	[90, 93)	**B-**	[80, 83)	**C-**	[70, 73)	**D-**	[60, 63)
B+	[87, 90)	**C+**	[77, 80)	**D+**	[67, 70)	**F**	< 60

III How to Approach and Succeed in the Course

You are in class with many other students learning the same material. Take advantage of that! Attend as many office hours as you can, work with others in the class, and ask questions during lecture.

The best way to succeed in a class of this level is to focus on two things. (1) You must really understand the material and, in particular, what all of the words mean. This class has a lot more vocabulary than most previous courses. (2) You must be able to apply what you have learned to solving new problems. The best way to do this is to practice. Try solving new problems on your own. Do not immediately look at the solutions. It is completely okay to be stuck for a while. Getting yourself unstuck is a great way to learn. Try some things that don't work, and figure out why they don't work. Look back at the definitions. Take a walk, then try again. Over time, your brain will learn how to solve problems.

Throughout the semester, it is normal to run into challenges in this course. These might be compounded by outside stressors. It is sometimes difficult to find the balance between using challenges as an opportunity to push yourself and knowing when to take a step back for your personal health and well being. Reach out! I am here to help you navigate the challenges in the course. You may also consider reaching out to the various support offices on campus, including:

- Dean of Students Office
- Academic Achievement Center
- Writing Center
- Quantitative Learning Center
- Center for Students with Disabilities
- Title IX Office
- Student Health and Wellness – Mental Health

Resources for Students Experiencing Distress

The University of Connecticut is committed to supporting students in their mental health, their psychological and social well-being, and their connection to their academic experience and overall wellness. The university believes that academic, personal, and professional development can flourish only when each member of our community is assured equitable access to mental health services. The university aims to make access to mental health attainable while fostering a community reflecting equity and diversity and understands that good mental health may lead to personal and professional growth, greater self-awareness, increased social engagement, enhanced academic success, and campus and community involvement.

Students who feel they may benefit from speaking with a mental health professional can find support and resources through the Student Health and Wellness-Mental Health (SHaW-MH)

office. Through SHaW-MH, students can make an appointment with a mental health professional and engage in confidential conversations or seek recommendations or referrals for any mental health or psychological concern.

Mental health services are included as part of the university's student health insurance plan and also partially funded through university fees. If you do not have UConn's student health insurance plan, most major insurance plans are also accepted. Students can visit the Student Health and Wellness-Mental Health located in Storrs on the main campus in the Arjona Building, 4th Floor, or contact the office at (860) 486-4705, or https://studenthealth.uconn.edu/ for services or questions.

IV Course Policies

Importance of Inclusivity

Throughout this course, you will be asked to interact with me and your classmates in different ways. Creating a safe, friendly, and respectful environment for everyone in the course is critical to learning. I will do my best to ensure each student in the class has equitable access to the course material as well as to opportunities to earn credit and participate. While you are interacting with your classmates, respect and be mindful of the diversity of background and experiences they bring to class. If at any time you feel that you or someone around is not being treated respectfully, do not hesitate to let me know.

Make-Up/Late Policy

Late *written* homework will not be accepted. Late *online* homework is accepted with a 15% penalty.

If there is an approved reason for you to not take an exam at its designated time, you must notify me in advance to make arrangements.

If you are unable to attend an exam due to an emergency situation, you should notify me by e-mail as soon as possible, within 36 hours of the start of the exam. Arrangements for a make-up test will be considered on a case by case basis.

Student Responsibilites and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important standards, policies and resources, which include:

- The Student Code
  - Academic Integrity
  - Resources on Avoiding Cheating and Plagiarism
- Copyrighted Materials
- Credit Hours and Workload
- Netiquette and Communication
- Adding or Dropping a Course
- Academic Calendar
- Policy Against Discrimination, Harassment, and Inappropriate Romantic Relationships
- Sexual Assault Reporting Policy

Accommodations for Students with Disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or http://csd.uconn.edu/.

Changes to the Course Syllabus

The information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

V Technical Assistance

This course uses the learning management platform, HuskyCT. If you have difficulty accessing HuskyCT, you have access to the in person/live person support options available during regular business hours through the Help Center. You also have 24x7 Course Support including access to live chat, phone, and support documents.

Technical and Academic Help provides a guide to technical and academic assistance.

Student Technology Training

Student technology training is now available in a new HuskyCT short course, created by students for students. It will prepare you to use the IT systems and services that you will

use throughout your time at UConn, whether you're learning online or on-campus. It is available here.

Minimum Technical Skills

To be successful in this course, you will need the following technical skills:

- Use electronic mail with attachments.
- Save files in commonly used word processing program formats.
- Copy and paste text, graphics, and hyperlinks.
- Work within two or more browser windows simultaneously.
- Open and access PDF files.