UCONN
UNIVERSITY OF CONNECTICUT

**Math 2210Q-001**

Linear Algebra
Spring 2024

Excluding materials for purchase, syllabus information may be subject to change. The most up-to-date syllabus is located within the course in HuskyCT.

## Course and Instructor Information

**Course Title: Applied Linear Algebra**
**Credits:** 3
**Mode/Format: In-Person**
**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.

**Class Meetings:** MWF 11:15 – 12:05, MONT 420

**Professor:** Nicole Massarelli, (You can call me Nicole or Professor Massarelli)
**Pronouns:** (she/her/hers)
**Email:** nicole.massarelli@uconn.edu
**Office Hours/Availability:** I will have office hours on Monday 3:00-4:30 and Wednesday 1:30-3:00 in my office - **MONT 303**. During office hours you are welcome to stop by my office to ask questions or discuss course material without an appointment. If you are unavailable during these times (or they are too busy), feel free to reach out to me and we can schedule an appointment to meet at another time.

## Course Materials

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. This course is part of our course material delivery program, Husky Book Bundle. You can access MyLab Math through HuskyCT.

## 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 factorizations, 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 will constitute a significant part of the course.

## Course Requirements and Grading

| Category | Overview | Weighting |
|---|---|---|
| Online HW | Due weekly on MyLab Math | 15% |
| Quizzes | 9 quizzes as indicated on course schedule, lowest quiz will be dropped | 15% |
| In-Semester Exams | 3 exams will be given during the semester | 20% each<br>60% total |
| Final Exam | Cumulative Final Exam given during Finals Week | 10% |

### Online Homework

There will be online homework corresponding to (almost) every section we cover. Online homework is due Wednesday the week following when the material is covered in class. The online homework is on MyLab Math. You must access it through HuskyCT.

### Quizzes

There will be quizzes given on Fridays on weeks when there is no exam scheduled. These quizzes will be a few questions on the sections listed on the schedule, typically key skills from the week before. Your lowest quiz score will be dropped.

### Exams

There are three exams and cumulative final exam. The exams are:

- Wednesday, Feb 7, 2024 covering Chapter 1.1-1.8.
- Wednesday, Mar 6, 2024 covering Chapters 1.9, 2, 3 and 4.1
- Wednesday, Apr 10, 2024 covering Chapters 4, 5
- Final Exam, TBD, cumulative

During the Final Exam period, you must take the final exam. You will also have the chance to retake one of the previous exams. An exam retake will be the same length as the original exam and cover the same material but will have different questions. Note you will only have 120 minutes to complete all exams. (You should expect the final exam to take about 60 min). Your exam retake will replace your previous exam score, if it is higher.

For additional information on undergraduate grading policies see here:
https://registrar.uconn.edu/grades/

## Calculators
Calculators are permitted for homework but will not be allowed on quizzes or exams.

## Grading Scale:

| Grade/ Points Earn | Letter Grade | GPA |
|---|---|---|
| 93-100 | A | 4.0 |
| 90-92.9 | A- | 3.7 |
| 87-89.9 | B+ | 3.3 |
| 83-86.9 | B | 3.0 |
| 80-82.9 | B- | 2.7 |
| 77-79.9 | C+ | 2.3 |
| 73-76.9 | C | 2.0 |
| 70-72.9 | C- | 1.7 |
| 67-69.9 | D+ | 1.3 |
| 63-66.9 | D | 1.0 |
| 60-62.9 | D- | 0.7 |
| <60 | F | 0.0 |

## Due Dates and Late Policy
All homework due dates will be published on each assignment. Online homework will be accepted late with a 15% penalty. I encourage you to keep up with the homework during the semester as it will help you prepare for quizzes and exams. Homework must be completed by the last day of class, April 26th to be counted.

You have the opportunity to make up 2 quizzes during the semester. You must email me to find a time to take the quiz the following week, before class on Wednesday.

If you need to reschedule an exam, please contact me as soon as possible. Exams must be made up before class the following Wednesday.

## Feedback and Grades
I will make every effort to provide feedback and grades within one week. (Exams will be returned one week after they are taken to allow time for make-ups). To keep track of your performance in the course, refer to My Grades in HuskyCT.

## Weekly Time Commitment
You should expect to dedicate 9 to 12 hours a week to this course. This expectation is based on the various course activities, assignments, and assessments and the University of Connecticut's policy regarding credit hours. (More information related to hours per week per credit can be accessed at the Online Student website).

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

## Course Calendar

*This is a tentative schedule and is subject to change. Please check HuskyCT for the most up to date information.

| Week #/Date | Monday | Wednesday | Friday |
|---|---|---|---|
| 1<br>Jan 15 | | 1.1 Systems of Linear Equations | 1.1 Systems of Linear Equations<br>1.2 Row Reduction and Echelon Form |
| 2<br>Jan 22 | 1.2 Row Reduction and Echelon Form<br>1.3 Vector Equations | 1.3 Vector Equations<br>1.4 The Matrix Equation Ax=b | 1.4 The Matrix Equation Ax=b<br>**Quiz 1: 1.1, 1.2** |
| 3<br>Jan 29 | 1.5 Solution Sets of Linear Systems | 1.7 Linear Independence | 1.8 Introduction to Linear Transformations<br>**Quiz 2: 1.3, 1.4** |
| 4<br>Feb 5 | Review | **Exam 1: Feb 7, 2024** | 1.9 The Matrix of a Linear Transformation |
| 5<br>Feb 12 | 2.1 Matrix Operations | 2.2 The Inverse of a Matrix | 2.3 Characterizations of Invertible Matrices<br>**Quiz 3: 1.9** |
| 6<br>Feb 19 | 3.1 Intro to Determinants | 3.2 Properties of Determinants | 3.3 Cramer's Rule, Volume and Linear Transformations<br>**Quiz 4: 2.2** |
| 7<br>Feb 26 | 4.1 Vector Spaces and Subspaces | 4.2 Null, Column and Row Spaces and Linear Transformations | 4.3 Linearly Independent Sets; Bases<br>**Quiz 5: 3.2, 3.2** |
| 8<br>Mar 4 | Review | **Exam 2: Mar 6, 2024** | 4.4 Coordinate Systems |
| **SPRING BREAK NO CLASS** | | | |
| 9<br>Mar 18 | 4.5 The Dimension of a Vector Space/Rank | 4.5 The Dimension of a Vector Space/Rank<br>4.6 Change of Basis | 4.6 Change of Basis<br>**Quiz 6: 4.4** |

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|---|---|---|---|
| 10<br>Mar 25 | 5.1 Eigenvectors and Eigenvalues | 5.2 The Characteristic Equation | 5.3 Diagonalization<br>**Quiz 7: 4.5, 4.6** |
| 11<br>Apr 1 | 5.4 Eigenvectors and Linear Transformations | 5.5 Complex Eigenvalues | 6.1 Inner Product, Length and Orthogonality<br>**Quiz 8: 5.1, 5.2** |
| 12<br>Apr 8 | Review | **Exam 3: Apr 10, 2024** | 6.2 Orthogonal Sets |
| 13<br>Apr 15 | 6.3 Orthogonal Projections | 6.4 The Gram-Schmidt Process | 6.5 Least Squares Solution<br>**Quiz 9: 6.1** |
| 14<br>Apr 22 | 7.1 Diagonalization of Symmetric Matrices | 7.2 Quadratic Forms | Catch up/Review for Final Exam |
| Finals Week | **FINAL EXAM Date and Time TBD** | | |

### How to Succeed in this Course

The best way to succeed in a class of this level is to dually 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's OK to be stuck for a while. Getting yourself unstuck is a great way to learn. Try some things that don't work. Think about it another way. Look back at the definitions. Walk around for a few hours. Then try again. Overtime, your brain will learn how to solve problems.
Please attend class whenever possible. I want to create an active learning environment in the classroom and that works best when there are people there. In class, actively participate. Ask questions! Let me know what you are thinking and if and when I've lost you.

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, listed below.
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

### Importance of Inclusivity

Throughout this course, you will be asked to interact with me and your classmates in different ways. Through these interactions, it is important to be mindful of the diversity of background

and experience each of us brings to the class. 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. I ask when you are working with other students you create a good environment for your classmates. This might take the form of using someone's preferred pronouns, acknowledging differences in learning styles or background knowledge, or respecting someone's choice to maintain physical distance in the classroom space. If at any time you feel that you or someone around you is not being treated respectfully, please do not hesitate to let me know.

## 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**.**

## Accommodations for Illness or Extended Absences

Please stay home if you are feeling ill and please go home if you are in class and start to feel ill. If illness prevents you from attending class, it is your responsibility to notify me as soon as possible. You do not need to disclose the nature of your illness, however, you will need to work with me to determine how you will complete coursework during your absence.

If life circumstances are affecting your ability to focus on courses and your UConn experience, students can email the Dean of Students at dos@uconn.edu to request support. Regional campus students should email the Student Services staff at their home campus to request support and faculty notification.

## Student Responsibilities 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

You should also read through the university's policy on Academic Integrity and Academic Misconduct.

### 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. 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/.

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government." (Retrieved March 24, 2013 from Blackboard's website)