MATH 2271 - 001 Enhanced Linear Algebra, Fall 2023

Class Meetings: MoTuWeFr from 12:55pm - 1:45pm in LCB 323
Instructor: Dr. Tim Tribone (he/him/his)
Email: tim.tribone@utah.edu
Office: JWB 328
Office Hours: TBD (will be posted on Canvas)
Textbook: *Introduction to Linear Algebra, 6th. ed.*, by Gilbert Strang. We will be following the newest version (6th ed.) which has been significantly improved over previous versions (most notably the CR factorization). Earlier versions are OK but they do contain all the material that we will cover in class so be wary of that. You can now purchase the 6th edition from the bookstore.

Course Information: Math 2271 Linear Algebra is an honors level 4 credit course. We will cover Chapters 1-8 in Strang's book (and hopefully some of chapter 10).
Course Description: Linear Algebra is the mathematics of functions between **finite dimensional linear spaces**. The elements of those spaces are **vectors**, and the functions are **matrices**. Linear Algebra is as central and fundamental to problem solving in Science and Engineering as is Calculus. You will also see that it has a beautiful, rich, and *comprehensible* structure. I hope that you will enjoy this class!

This class, Math 2271, covers the same material as Math 2270. It serves as a prerequisite wherever Math 2270 does. It differs from Math 2270 in several aspects: we use a different textbook, there is more emphasis on concepts and connections as opposed to computations, we may go into greater depth in some topics, and the class is smaller than the usual 2270 sections. The class is designed for students who are particularly well motivated, and keen to get a deeper insight into Linear Algebra.
Prerequisites: 'B' or better in MATH 1220 OR MATH 1260 OR MATH 1320 OR MATH 1321 OR MATH 2210 OR MATH 2310 OR AP Calculus BC score of 5

Canvas: Canvas will be used for posting course announcements, homework assignments, grades, files and any relevant supplementary material. You can access the Canvas page through CIS or by logging in at utah.instructure.com. Students should check the Canvas announcements regularly for course information and resources. Email notifications and correspondence will be sent to the student's UMail address ([u-number]@utah.edu); this email account must be checked regularly.
Discord: I have made a **Discord Server** for our class. Use this server to connect with your classmates; ask for help with homework, ask for notes from class that you missed, organize study sessions, etc. I also keep Discord open on my computer so it is often a good way to ask me a quick question. Any important questions (about grades, absences, etc) must be sent through Canvas. Please keep discord communication appropriate and respectful.
Grading: The following are the grade components and the percentage each contributes to a student's final grade:

- **Homework (25%)** - The homework is the most important part of this class (and most math classes). To get the most out of this class you should attempt as many of the problems in the textbook as you can. The problems are often quite unusual, with a twist, and are sometimes challenging. The homework assignments will consist mostly of problems from the textbook. They will be graded and will count towards 25% of your final grade. However, it's a good

idea to work more of the book exercises than those in the homework sets. If you get stuck on any of them feel free to talk with me.

A homework assignment will be due most Fridays by the end of the day on Gradescope (11:59pm). The schedule will be posted on the course homepage. The homework will typically be on material covered up to and including the preceding Monday. The lowest homework score will be dropped at the end of the semester.

Late Policy: There is an automatic two-day grace period for homework. In other words, you may turn in your homework up to 48 hours late with no penalty. You do not need to ask for this extension. After the 2-day extension, late assignments will not be accepted except in rare situations.

- **Classwork and Participation (5%)** - Throughout the semester there will be opportunity for you to work with your classmates on mathematics. This may include group assignments, group presentations, and/or group projects. Your participation in these activities will be evaluated based on effort/completion and will make up 5% of your total grade. In particular, I expect regular attendance from all students; this is an enhanced version of 2270 and there's no reason to take this version if you don't plan to come to every lecture.

- **Quizzes (5% each)** - In between each midterm exam will be a quiz (three total). Each quiz will have two parts: A take-home portion and an in-class portion. The in-class portion is designed to make sure everyone is keeping up with the material. It will be shorter and will focus on the fundamental techniques of the course. The take-home portion will be more challenging and will focus on connecting concepts we've learned in class. You are encouraged to work with your class-mates on the take-home portion. It is open note and open book. However, you must write up you own solutions and may not copy other peoples work.

  The in-class portion will be given on Fridays at the end of class. Take-home portion will open on Fridays and be due the following Monday night. The dates of the in-class portion of each quiz are listed below:

  - **Quiz 1: September 8, 2022**
  - **Quiz 2: October 20, 2022**
  - **Quiz 3: December 1, 2022**

- **Midterm Exams (15% each)** - Two 50-minute midterm exams will be given on select Fridays (in our normal classroom).

  Dates of the midterm exams will be:

  - **Exam 1: September 22, 2023**
  - **Exam 2: November 3, 2023**

  These dates are subject to change.

- **Final Exam (25%)** - A two-hour comprehensive exam will be given at the end of the summer semester. Our final exam is scheduled for

Wednesday, December 13, 2023 | 1:00pm - 3:00pm

Canvas will always display a "Total" score. This is a tool to help you approximate your current grade but it is **not** your official grade. Your final course grade will be calculated at the end of the semester according to the table below.

Grading Scale: Final course letter grades will be determined by the table below:

Letter Grade	% Range
A	$[90, 100]$
A-	$[85, 90)$
B+	$[80, 90)$
B	$[75, 80)$
B-	$[70, 75)$
C+	$[65, 70)$
C	$[60, 65)$
C-	$[55, 60)$
D+	$[50, 55)$
D	$[45, 50)$
D-	$[40, 45)$
E	$[0, 40)$

The instructor retains the right to modify this grading scheme during the course of the semester; students will, of course, be notified of any adjustments.

Additional Resources

- **Tutoring Center & Computer Lab** - There is free tutoring in the T. Benny Rushing Mathematics Student Center (room 155, the lower level between JWB and LCB), as well as a computer lab. For more information see https://www.math.utah.edu/undergraduate/mathcenter.php

- **Private Tutoring** - ASUU Tutoring Center, 330 SSB. There is also a list of tutors at the math department office JWB 233.

- **Departmental Videos** - The math department has a full set of lecture videos for MATH 2270, created by Seungsu Lee, which you are welcome to use to supplement our course material. These can be found at this link. The material of 2270 is given in a different order than 2271 but the fundamentals are essentially the same.

How to Succeed in this Class: If you follow the suggestions in this section you will **save time** and **understand** the subject **more deeply and more effectively**.

- Mathematics in general, and Linear Algebra in particular, is hierarchical. Everything we do in an organized class like this is a small extension of what we did previously, often the day before. If you understand what we did yesterday you will easily understand what we do today. If you do not, what we do today will be confusing, and making sense of it will be difficult and time consuming.

- Read the relevant section in the textbook before each class. In my opinion, the book is excellent and is worth reading! After class make sure you understand what we did in class.

- Pay careful attention to the precise language we will develop in this class. If you dont understand a word or phrase, **stop**, go back and review that word or phrase before going on. If you dont understand the language you cant effectively think about the subject, and you wont understand it.

- Attempt some of the textbook problems corresponding to a certain textbook section after we cover the topic in class, and before you attend the next class. This will help you internalize the definitions and techniques.

- Nowadays most linear algebra problems are solved by computer. We need to understand linear algebra so that we can tell computers what to do, and to understand what they are doing. So this class is focused on understanding concepts, facts, properties, and connections. We will do computations to deepen our understanding, and its in the nature of computer graded home work that much of it is computational. However, you want to concentrate your attention on the concepts.

- You will often need to read your notes, or the textbook, **repeatedly** before you understand whats happening.

- **Come to class.** This is an enhanced/honors version of 2270. The enhanced aspect is what we will be able to accomplish during lecture! If you don't come to class, there's no reason to take this version over 2270.

- I recommend that you form a **study group** with one or two class mates and meet on a regular basis to study together and to work on the home work together. The purpose of the home work is to help you understand the subject, so you should organize your team work so that every member of your group understands fully what is happening in each problem.

- **Seek help!** Talk with your class mates, ask tutors in the math center, and dont hesitate to contact me with your queries.

COVID Statement: The COVID-19 guidelines for the University of Utah are adapted often due to the ever-changing status of the pandemic. For the most up-to-date information regarding the campus guidelines, visit `https://coronavirus.utah.edu`.

Student Responsibilities: All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for

the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, and I will do so, beginning with verbal warnings and progressing to dismissal from and class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee. http://regulations.utah.edu/academics/6-400.php

ADA Statement: The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, 801-581-5020. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

Addressing Sexual Misconduct: Title IX makes it clear that violence and harassment based on sex and gender (which Includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veterans status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

Student Names and Personal Pronouns: Class rosters are provided to the instructor with the students legal name as well as "Preferred first name" (if previously entered by you in the Student Profile section of your CIS account). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class, on papers, exams, group projects, etc. Please advise me of any name or pronoun changes (and update CIS) so I can help create a learning environment in which you, your name, and your pronoun will be respected. If you need assistance getting your preferred name on your UIDcard, please visit the LGBT Resource Center Room 409 in the Olpin Union Building, or email bpeacock@sa.utah.edu to schedule a time to drop by. The LGBT Resource Center hours are M-F 8am-5pm, and 8am-6pm on Tuesdays.

Wellness Statement: Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at www.wellness.utah.edu or 801-581-7776.

Safety Statement: The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu.

University Counseling Center The University Counseling Center (UCC) provides developmental, preventive, and therapeutic services and programs that promote the intellectual, emotional, cultural, and social development of University of Utah students. They advocate a philosophy of acceptance, compassion, and support for those they serve, as well as for each other. They aspire to respect cultural, individual and role differences as they continually work toward creating a safe and affirming climate for individuals of all ages, cultures, ethnicities, genders, gender identities,

languages, mental and physical abilities, national origins, races, religions, sexual orientations, sizes and socioeconomic statuses.

Office of the Dean of Students The Office of the Dean of Students is dedicated to being a resource to students through support, advocacy, involvement, and accountability. It serves as a support for students facing challenges to their success as students, and assists with the interpretation of University policy and regulations. Please consider reaching out to the Office of Dean of Students for any questions, issues and concerns. 200 South Central Campus Dr., Suite 270. Monday-Friday 8 am-5 pm.

Student Success Advocates: The mission of Student Success Advocates is to support students in making the most of their University of Utah experience (ssa.utah.edu). They can assist with mentoring, resources, etc. Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact a Student Success Advocate for support `https://asuu.utah.edu/displaced-students`.