Sp24 MATH D002B 09Y, 09Y Linear Algebra

Course Description:

Linear algebra and selected topics of mathematical analysis.

Student Learning Outcomes:

Upon successful completion of the course, students will be able to:

- Construct and evaluate linear systems/models to solve application problems.
- Solve problems by deciding upon and applying appropriate algorithms/concepts from linear algebra.
- Apply theoretical principles of linear algebra to define properties of linear transformations, matrices and vector spaces.

Course Content:

- Solve and analyze systems of linear equations using matrices and matrix theory
- Investigate special matrices and matrix operations including powers and factorization
- Develop understanding and use of n-dimensional vectors and vector operations
- Define and investigate vector spaces and vector sub-spaces and find their bases and dimensions
- Establish understanding of linear transformations and their geometry and find their matrix representation
- Define eigenvalues and eigenvectors and use them to diagonalize square matrices and solve related problems
- Utilize methods of linear algebra to solve application problems selected from engineering, science and related fields
- Prove basic results in linear algebra using appropriate proof-writing techniques

Important Notes About Expectations:

- **Communication**: You can contact me via email (bambhaniadoli@fhda.edu) or via Canvas message. You can expect a response within 24 hours on weekdays and within 48 hours on the weekend. If you don't get a reply back to your email, try Canvas message, and the vice versa.
- **Engagement**: I expect you to attend each class on time, ask and answer questions, discuss questions with classmates during class, and participate when called on. I expect you to complete work in a timely way, and communicate with me if there are any issues preventing you from progressing normally in class. Please note that if you're not attending class or submitting assignments during the first two weeks of class, I will assume that you are not interested in the taking the class and may drop you!
- **Feedback**: Any feedback on your submissions will be provided as annotations or comments for online submissions. If you need additional feedback regarding grading (especially automatically graded items such as homework), please email/message me directly about that assessment. I will aim to grade all items within a few days of submission, but you can expect most assignments and assessments to be graded within 1 week of submission.

If, for any reason, you stop participating and intend to drop the class, please do an official drop in a timely manner. If you fail to do so, you will receive an 'F' in the class. Follow the deadlines for this class in My Portal. I do not have the ability to make exceptions to these.

Textbook and Calculator:

Great news: your textbook for this class is available for **free** online A First Course in Linear Algebra

You will need a scientific calculator, and occasionally a matrix calculator, for this class. This can be a physical or an online app, such as the one at Desmos.

Prepared Lecture Notes:

I have put together prepared lecture notes for this class. They are designed to keep you organized. Please print the prepared lecture notes, or open them on a tablet if you have the ability to annotate electronically. Here they are: Math2B-LectureNotes-Kuttler-LibreTexts.pdfDownload Math2B-LectureNotes-Kuttler-LibreTexts.pdf

Office Hours:

- Monday, Wednesday: 1-2pm in S-55 (PST Village Room)
- Tuesdays, Thursdays: 1-2pm in S-54 (MESA Center)
- Or, by appointment (email me to schedule)

Homework and Problem Sets

The best way to succeed in any math class is to do all of the assigned work correctly and in a timely manner, making sure you really understand what you are doing! Focus on how to think mathematically about problems, not just on following a procedure! Time spent on the homework and problem sets will directly benefit you on quizzes and exams.

Online Homework: You will have online homework for each chapter we cover. The homework uses the free software MyOpenMath, and will be graded for correctness. The links and due dates are within the Canvas Modules. The homework for a chapter will be due 1-2 days after we complete the chapter. You will have 2 late passes, each of which will give you a 24-hour extension on the homework for a particular chapter, but will have a 5% penalty.

Problem Sets: Each week (except Week 11), we will have a problem set that you will work on. These problems will be posted as a PDF in the Canvas modules.

Problem Sets Submission Guidelines:

- *Even though you are welcome to discuss the problems with your classmates, write up your own solutions independently. **Never** copy anyone's work for any reason!*
- *Label each problem clearly – use a **highlighter** to mark the number, or put a **box** around it so it's easy to find. You don't need to write the question, just fully-worked out solutions.*
- *Leave some white space around the problem for comments.*
- *Do the problems in **order**, showing all work neatly, clearly and completely.*
- *Write your solutions out in full detail, as modeled in the textbook and in lectures. It's important to write up problem sets neatly, showing all work, and explaining the logic behind each step.*
- *Submit each problem set on paper in class or as a **single** PDF document (NOT multiple images). If you submit electronically, use the Notes app on iOS, or a scanning app such as Adobe Scan or Genius Scan (both free). Be sure to check that your scanned copy is legible and has correct orientation. I will need to be able to read it for you to get points.*
- *Problem sets are due on **Tuesdays** at 11:30a.m. You can have a 24-hour **extension** with 10% penalty.*

Discussions:

Occasionally, we will have Canvas discussions in this class. Discussions are designed to deepen your understanding of the material in this class.

Project:

We will have one group project in this class You will present an application of linear algebra to the class during Week 11.

Quizzes:

We will have **seven** 20-30 minute quizzes during class on, typically on Tuesdays. See the calendar below for the dates.

IMPORTANT: There will be NO MAKEUPS for any of the quizzes, but your lowest two quiz scores will be dropped.

Exams:

We will have **two** midterm exams, and a <u>cumulative</u> final exam. See the calendar below for the dates.

IMPORTANT: There will be NO MAKEUPS for any of the exams. Your lowest midterm score will be replaced by the final exam proportionally if the final exam score is higher. This will also be done in case of a missed exam.

NOTE ABOUT THE FINAL EXAM: In case of an unforeseen emergency or illness due to which you cannot take the final exam, you may be given an 'Incomplete', provided that you supply me with a sufficient proof.

Evaluation:

Your final grade will be computed as follows:

Category		Points
Homework	7 @ 10 points each, on average	70
Problem Sets	10 @ 6 points each	60
Discussions	5 @ 5 points each	25
Project		45
Quizzes	Top 5 @ 20 points each	100
Exams	2 @ 80 points each	160
Final Exam		140
TOTAL		**600**

Overall percentage	Your grade will be at least
97% or greater	A+
92% to less than 97%	A
90% to less than 92%	A-
87% to less than 90%	B+
82% to less than 87%	B
80% to less than 82%	B-
75% to less than 80%	C+
70% to less than 75%	C
55% to less than 70%	D
less than 55%	F

Help:

1. Your classmates are a great resource. Ask for help and provide help to others either within your current groups or using Canvas discussion boards!
2. Message me through Canvas with questions or attend office hours. For online homework questions, message me by using 'Message Instructor' button in the problem.
3. Ask questions during class.
4. Get help from De Anza's Math Student Success Center. See details at http://deanza.edu/studentsuccess/
5. Use NetTutor for help through Canvas.
6. If you need any technical help with MyPortal, Canvas, etc., visit https://www.deanza.edu/quarter-guide/#Learning.
7. On the link above, you will also find links to services with some specific to this time, such as for help with tech equipment, food and financial assistance, health services, resources for undocumented students, etc.

Academic Integrity:

All students are expected to exercise academic integrity throughout the term. Any instances of cheating or plagiarism will result in disciplinary action, including at minimum, 0 on the assignment or assessment, but may include recommendation for dismissal. You are encouraged to work together but simply copying down from someone else's work is wrong! Cheating on a quiz or an exam is more serious. It will result in getting a 0 on the entire assessment, but could result in getting an 'F' in the course or dismissal from the class. Also, each incident of cheating will be reported to the Dean of the Physical Science, Mathematics and Engineering Division and the Office of Student Development. Please see the De Anza College's page on Academic Integrity: https://www.deanza.edu/policies/academic_integrity.html. Check out this video produced by De Anza College on this topic: https://www.youtube.com/watch?v=4unoOe-loeY.

A note about Discord: I encourage you to ask and answer questions amongst yourselves to strengthen your understanding of topics in this class using any medium, including Canvas discussion boards and Discord. However, be careful that you don't compromise your academic integrity or entice others to compromise theirs! For example, never answer a classmate's question about a homework problem by providing a complete, fully worked out solution! There are at least two reasons for this: 1) It would create too much of a temptation to copy - not just for the original question poster but other classmates; and 2) Your solution could be incorrect, in which case you would be hindering the class' understanding of the involved concepts and skills. You should also never discuss quiz or an exam questions on Discord or any medium until after they have been passed back. Some students may have a

special accommodation that allows them to have a later submission time. Discussing solutions could compromise the integrity of their submission.

Disability Notice:

If you feel that you may need an accommodation based on the impact of a disability, please contact me privately to discuss your specific needs. Also, please contact Disability Support Programs & Services through https://www.deanza.edu/dsps/. for information or questions about eligibility, services and accommodations for physical, psychological or learning disabilities.

Honors Cohort:

This class is offered as an Honors cohort for interested students in the Honors Program. If you are interested in taking this class through the Honors Program, please email me so I can give you the Honors section add code. If you do not know about De Anza's Honors Program, please visit https://www.deanza.edu/honors/ to learn about how it works.

If you take this class as an Honors cohort, you will be required to complete a substantial honors project. Failure to complete the project will result in a reduction of your grade.

Tips for Success:

In any math class, and especially this one, your goal should be to get **ownership** of the material. Some students find this class *conceptually* difficult. When you feel you've understood a concept, you should be able to explain it to someone who doesn't. The material covered in this class is essential in so many other disciplines, such as engineering, physics, computer science, statistics, etc. This is not a "learn and forget" class; rather, it's a "learn well so you can succeed going forward" class.

Here are my recommendations for succeeding in this class in the online setting:

1. **Think about, and do work related to the class, every day**. Check for upcoming deadlines and make sure you are aware of them.
2. **Stay on schedule**. Start homework early. Don't fall behind! Be disciplined about this to stay on top of the class.
3. **Be fully present while doing class-related activities.** Allowing yourself to multi-task during class and allowing disruptions while working on homework and problem sets is a slippery slope. It can easily turn into a bad habit that can bring undesired outcomes.
4. **Invite productive struggle.** I am aware that there are many sources that can provide you the answers and even the worked solutions. However, **productive struggle** is essential in learning and retaining the material, and in gaining the confidence in your ability to understand difficult concepts and solve challenging problems.
5. **Form a study group**. Actively stay in touch with at least 3 other people in the class community. Meet with them regularly for video sessions discussing homework and problem sets, and studying for exams. This is an **essential college skill**, especially for STEM students.
6. **Prepare well for quizzes and exams.** Preparing well for quizzes will help you retain the material for exams. Preparing well for exams will help you better retain the material for future use. If you are not prepared well for quizzes and exams, you will likely NOT be able to finish them!
7. **Don't wait to ask for help!** Whether it's to your classmates or me, get your questions answered in a timely manner. If you're dealing with an unusual or an unexpected challenge, please let me know so I can work with you to keep the class manageable, if possible.
8. **Practice personal discipline!** Succeeding in a college class requires personal discipline. A life skill you should practice this quarter: **Be mindful of what you are giving your attention to**. Focus on your priorities, and give the most time and attention to the biggest ones. This class requires focus and it will often challenge you. Don't put off working on something because it's hard or unpleasant. Learning anything that's worthwhile requires a sustained effort! And that practice is what ultimately leads to true personal growth.

Math 2B Linear Algebra - Tentative Calendar: Spring 2024

	Monday	Tuesday	Wednesday	Thursday
Week 1	8-Apr Orientation/Questions 1.1, 1.2	9-Apr 1.2, 1.3	10-Apr 1.4, 1.5	11-Apr 1.6, 2.1
Week 2	15-Apr Questions 2.2	16-Apr Problem Set 1 due **Quiz 1** 2.3, 2.4	17-Apr 2.5, 2.6, 2.7	18-Apr 2.8, 2.9, 2.10
Week 3	22-Apr Questions 3.1	23-Apr Problem Set 2 due **Quiz 2** 3.2	24-Apr 3.2, 4.1-4.9	25-Apr 4.1-4.9
Week 4	29-Apr Questions 4.10	30-Apr Problem Set 3 due **Quiz 3** 4.10	1-May 4.10	2-May 4.10
Week 5	6-May Questions 4.11	7-May Problem Set 4 due **Midterm Exam 1** 4.11	8-May 4.11	9-May 4.11, 5.1, 5.2
Week 6	13-May Questions 5.3	14-May Problem Set 5 due **Quiz 4** 5.3, 5.4	15-May 5.4, 5.5	16-May 5.6, 5.7
Week 7	20-May Questions 5.8	21-May Problem Set 6 due **Quiz 5** 5.8	22-May 7.1	23-May 7.2
Week 8	27-May **HOLIDAY:** **Memorial Day**	28-May Questions 7.2	29-May Problem Set 7 due **Quiz 6** 7.4	30-May 7.4, 9.1
Week 9	3-Jun Questions 9.1	4-Jun Problem Set 8 due **Quiz 7** 9.2	5-Jun 9.3, 9.4	6-Jun 9.4
Week 10	10-Jun Questions 9.5	11-Jun Problem Set 9 due **Midterm Exam 2**	12-Jun 9.6, 9.7	13-Jun 9.8, 9.9
Week 11	17-Jun Project Presentations	18-Jun Project Presentations	19-Jun **HOLIDAY:** **Juneteenth**	20-Jun Project Presentations
Finals Week	24-Jun **Final Exam** **11:30-1:30**	25-Jun	26-Jun	27-Jun

Student Learning Outcome(s):

• Construct and evaluate linear systems/models to solve application problems.
• Solve problems by deciding upon and applying appropriate algorithms/concepts from linear algebra.
• Apply theoretical principles of linear algebra to define properties of linear transformations, matrices and vector spaces.

Office Hours:

| M,W | 01:00 PM | 02:00 PM | In-Person | S-55 |
| T,TH | 01:00 PM | 02:00 PM | In-Person | S-54 |