EK 103: Computational linear algebra (Spring 2025)

Our team of instructors:

Section	Times	Room	Instructor	Office hrs
A1	TTH 9:30 am - 10:45 am	PHO 203	Andrew Sabelhaus asabelha@bu.edu	Office: 110 Cummington (ENG 421) • TBD
A3	TTH 11:00 am - 12:15 pm	PHO 210	Eric Chang changer@bu.edu	Office: 665 Comm Ave (CDS 329) • Wed 1:30 – 3:00 pm (in person – office) • Thurs 2:30 – 4:00 pm (in person – office)
A4	TTH 11:00 am - 12:15 pm	EPC 209	Andy Fan fana@bu.edu	Office: 44 Cummington (ERB 707) • Mon 11:45 -12:45 pm (in person – office) • Tues 12:45 - 1:45 pm (in person – office)
A5	TTH 3:30 pm - 4:45 pm	PHO 210	Hamid Nawab hamid@bu.edu	Office: 8 St. Mary's St (PHO 433) • Mon 3:30 4:00 pm (Remote – via Zoom) • Mon 4:30 – 5:00 pm (Remote – via Zoom) • Wed 3:30 – 4:00 pm (Remote – via Zoom)
A6	TTH 5:00 pm - 6:15 pm	PHO 210	Kamal Sen kamalsen@bu.edu	Office: 44 Cummington (ERB 412D) • TBD
A7	TTH 3:30 pm - 4:45 pm	EPC 205	Kenneth Sebesta kenn@bu.edu	Office: 730 Comm Ave (RASTIC) • TBD

Our graduate teaching assistant team:

TA	Email	The TA is assigned to this section	Joint office hours
Juan Pacheco Garcia	jcp29@bu.edu	A1 (Sabelhaus)	We will have "open" office hours where people can come in and ask questions on homeworks, matlab, etc! Tues: 6:15 – 8:15 pm ---> Room: PSY B41 Wed: 5:30 – 8:30 pm ---> Room: CAS 235 *Overflow room for Wed:* CAS 237 (Note: PSY B41 is along the big hallway in the basement of PSY / SOC)
Zecheng Yi	zeyi@bu.edu	A3 (Chang)	
Vivian Shi	vshi@bu.edu	A4 (Fan)	
Yiting Chen	yich4684@bu.edu	A5 (Nawab)	
Grant McConachie	gdmac@bu.edu	A6 (Sen)	
Damola Ajeyemi	dajeyemi@bu.edu	A7 (Sebesta)	

Objectives: This is a course on understanding the fundamentals of modern data science, where we will learn how to manipulate and apply linear systems of equations in the context of matrices and linear algebra. Moreover, we will also try to think outside of the box and tease out some cool (and really useful) linear relationships among numbers, algebra, geometry, and calculus in an ***abstract*** fashion. Along the way, we will reinforce your ***programming*** skills because, after all, there's just way too much data for anyone to compute by hand in the 21st century !

Prerequisite

- EK 125: Basic programming skills (can be taken concurrently with EK 103)
- Algebra, trig, & geometry: You cannot be an engineer if you are scared of math ! You will be tested… =)

- A laptop that you can do homework on (with matlab installed)

Textbooks:

D.C. Lay, S.R. Lay, and J.J. McDonald: *Linear Algebra and its Applications (6th ed),* ISBN 978-0135851258

Note: You can also buy an used copy of the 5th edition of the textbook from Amazon. However, you will have to match up the table of contents between the 2 editions before every reading assignments.

Grading: Here's the lowdown (Homeworks are issued + due every Thursdays)

10%	Discussion attendance / participation / small quizzes
30%	Homeworks
20%	Midterm #1
20%	Midterm #2
20%	Final

Re-grading policy: Requests for regrading homeworks or exams must happen **within 1 week** from the day in which the material was handed back to you.

Note that grading of the assignments themselves will be done individually per section. Different instructors will use different scoring methods. ***Final letter grades may vary between sections, even if numerical scores are similar*** - each instructor may cover slightly different content. Also, late assignment policies vary by section. Check with your instructor.

Midterms:

There will be 2 Friday night midterms. If you have a scheduling conflict (ie. Physics / Chemistry /Calculus labs & exams), please let us know in advance (***10 day notice***) so that we can arrange for alternate exam dates and classrooms.

Each midterm (and the final exam) will be closed textbook, closed notes, and closed from all electronic devices. This means you cannot use your phones, smart watches, or even basic battery-powered calculators that you might have from high school. With that said, we will provide you with a printed formula sheet that includes all the necessary information you will need for each exam.

** **Important:** See our academic integrity rules at the end of this document. You will be asked to show all your work on the exams (ie. Writing calculation steps down on paper, etc… !!).

Tentative midterm dates

	Time	Location
Midterm #1	Fri 2/28/25 , 6:45 – 8:45 pm	To be determined
Midterm #2	Fri 4/11/25 , 6:45 – 8:45 pm	To be determined

Friday discussion sections (and the "small quizzes") :

We encourage everyone to attend our Friday discussion sections, where the TA's will:

a) ***Issue a small quiz*** during the middle of the session (it will count towards part of your 10% participation grade)
The purpose of the quiz is to help you know where you stand in terms of the lecture materials for that particular week (ie. Do I need to study more this weekend, or do I need to reserve more time to work on the next homework?)

b) They will also work out example problems that you might see on your homeworks and exams
c) They will also answer any questions you might have

In the past, students who chose to attend our discussion sections will often do better on exams (no joke – we keep statistics on this !) Just like any other class: The more practice problems you do, the better your grades will be !! =)

Course websites: There are 3 websites of interest:

1) EK 103 Blackboard site: Some instructors will use Blackboard. Those sections will announce on the first day of class. You may be asked to upload your matlab code there in addition to Gradescope. Grades may be synced to Blackboard or may only appear in Gradescope. Ask your instructor if you have questions.

2) Gradescope: Once we release the homework assignment PDFs on slack, you will submit them via Gradescope. Your homework and exam grades will also appear there. Your instructor should add you to their Gradescope page automatically. If you don't have access before the first homework is due, send your instructor a note.

3) EK 103 Slack workspace: https://join.slack.com/t/ek103spring2025/signup

This is where the main action is ! Just click on the line above and sign up. Then, from this site, you can:

- Download current versions of all homework sets, homework solutions, practice exams & exam solutions
- Get online help by asking us questions on lecture materials and homeworks

- The instructors and GSTs are only active on Slack at certain times. Some of us only answer questions during working hours (9am-5pm), and we may take a day or two to answer some questions. *Do not wait to ask questions at 2am* before the homework is due !!

There will also be separate channels for each section (for example, #a1_sabelhaus or #a7_sebesta). Ask questions specific to your instructor's policies there.

ChatGPT – and how it pertains to EK 103

ChatGPT has gotten a lot of interest lately - generative AI! The world will be different! We believe you will see otherwise, once you start working in this class, since we will often ask you for conceptual answers to word problems that are beyond the scope of text-prediction-based AI. Currently, we do not have a dedicated ChatGPT policy, and instead, we treat ChatGPT like any other engineering tool. However, there are 2 stipulations:

1) ***We require that you cite your sources***: If you used MATLAB to solve a problem, tell us. If you consulted ChatGPT, tell us.

2) You ***cannot*** use ChatGPT on ***exams*** (it is closed book, closed electronic devices anyways !)

Consider ChatGPT like a classmate. Sure - you can talk with them while you're working on homeworks, but you shouldn't just copy their answers without knowing how to do the problems, right ??!! Similarly, if you only rely on your friends to explain everything to you (ie. Use ChatGPT exclusively for studying), then you probably won't do as well on exams.

On the same token, since you're usually not allowed to talk to your classmates during exams, you shouldn't use ChatGPT there. On exams, we will be checking to ensure that no internet tools (like ChatGPT) are used. Violations of this policy are relatively serious, so please ask us if you have any questions or would like clarification.

Remember – ChatGPT ***can (and does) produce incorrect answers*** to both numerical problems and conceptual problems. As of spring 2025, it is still not smart enough to correctly calculate every matrix problem that you can throw at it. Trust us – we've tried it on past exam problems, and 50% of the time, it will not give you what we're looking for on exams =)

Academic integrity & collaborations on homeworks:

Don't cheat… just don't do it ! You will get into trouble if you are caught. For more information on BU's Academic Conduct Code (with examples on homework plagiarism), please follow this link:

http://www.bu.edu/academics/policies/academic-conduct-code/

We don't mind you working on homeworks and learning together with your friends, but when you are turning in your own homework, *you have to write the answers in your own words*. In general:

- You must clearly acknowledge all of your sources (including human collaborations) at the top of your homework
- You must write all answers in your own words
- Furthermore, ***you must be able to fully explain your answers upon demand from either the TAs or instructors (we will use this for cases involving misconduct disputes)***.
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Failure to meet any of the above conditions could constitute plagiarism and will be considered cheating in EK 103. If you are not sure whether something is permitted by the course policy, please ask one of the faculty. It is far more awkward to explain your actions after the fact to the college disciplinary committee.