

MTH 309 Introduction to Linear Algebra Syllabus - Fall 2024

Lectures: Tue, Thu 9:30-10:50 AM, Math 250

Recitations: H1: 9:00-9:50 AM, Math 150
H2: 10:00-10:50 AM, Math 150

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Course Resources:

- **Course Website:** mth309.ubmath.info (or: learning.buffalo.edu/courses/course-v1:UBx+101+2024_Fall_Badzioch/course/)

This website will be used for posting all materials related to this course: online homework assignments, lecture notes, an up-to-date version of the syllabus, course schedule etc. I will explain it how to use it during the first lecture.

- **Lecture notes.** Skeletal lecture notes for each week will be posted on the course website under *Lecture Notes* tab. I will annotate these notes during lectures. Please print the notes and bring them to class to follow along.
- **Anaconda Distribution of Python.** This course will often rely on computer-based calculations (but you do not need any prior computing/programming experience). We will be using the Anaconda distribution of Python 3.12. This is free software available for Mac, Linux, and Windows that can be downloaded here:

www.anaconda.com/download/success

Even if you have Python already installed on your computer, you should install this distribution since it includes Jupyter notebook and some Python modules we will need. It will be convenient if you install the software on a laptop, if you have one, since then you will be able to bring it to recitations or office hours if needed.

- **Piazza.** We be using Piazza for course-related communications. The link to the Piazza webpage for this course is

piazza.com/buffalo/fall2024/mth309h/home

If you have a question or comment related to the course please post it on Piazza. This will help other students who may face the same issue. If you know the answer to a question somebody else posted on Piazza please answer it.

If you have a personal question (concerning your grade etc.), you can either send to me a private message on Piazza or contact me by e-mail.

- **Textbook.** P. Selinger, *Matrix Theory and Linear Algebra*. This is a free text, available online here:

www.mathstat.dal.ca/~selinger/linear-algebra/

While we will cover almost all material of this book, we will not follow it too closely. Also, we will not use it for homework.

- **UBLearns.** We will use UBLearns rarely. It may be of use for some homework assignments.

Homework. All homework assignments will be posted on the course website, under the *Course* tab. Homework will be assigned each Thursday and will be due on Friday the following week.

Exams. There will be three midterm exams:

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|---------------|------------------------|---------------|--------------|
| Exam 1 | Thursday, October 3 | 9:30-10:50 AM | Math 250 |
| Exam 2 | Thursday, October 31 | 9:30-10:50 AM | Math 250 |
| Exam 3 | Wednesday, December 18 | 8:00-11:00 AM | Fronczak 454 |

Grading:

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|-----------------|-----|
| Homework | 19% |
| Exam 1 | 27% |
| Exam 3 | 27% |
| Exam 3 | 27% |

In addition, you can get up to 5% extra credit for class participation. Class participation includes asking or answering question in class or on Piazza, office hours attendance etc.

What to expect from this course.

- **What is it good for.** Linear algebra is a major area of mathematics with a lot of applications in computer science, engineering, data analysis, business etc. I will explain several of such applications during this course.
- **What should be easy.** One reason behind usefulness of linear algebra is that computations involved in many of its problems are fairly easy to perform. In effect, computations in this course should be easier than the ones you saw e.g. in calculus classes.
- **What may be harder.** This course will mix computational parts with some theory. Understanding of linear algebra concepts is necessary for any serious applications (e.g. you won't have any use of computing eigenvectors unless you understand what an eigenvector is). This is usually a more difficult

facet of linear algebra courses: there are a lot of new notions that you will need to learn and understand how they relate to one another. Both computational and theoretical problems will appear in homework assignments and exams.

- **Why we will use computers in this course.** Manual calculations are useful when one is learning linear algebra, since they show how linear algebra works. However, in almost all applications the amount of data is far too large to compute anything by hand. Typically one uses conceptual knowledge of linear algebra to set up a problem and to interpret its solution, but computations are handled by a computer. Computer-based components of this course are intended to reflect this. Computing tools we will use (Python, Jupyter notebook) are free and used in many industries, so there is a good chance that you will find them of use in other courses and in your professional career.

Math Help Center. The Math Help Center is an additional place (beside lectures, recitations, and office hours) where you can seek help with questions related to this course. The Math Help Center is open Monday-Friday 10:00 AM-6:00 PM in room 110 of the Mathematics Building and it is staffed by math graduate students. The Math Help Center opens on Tuesday, September 3.

Learning Outcomes. See the MTH 309 Sample Syllabus posted on the Math Department website for a description of learning outcomes of this course:

www.buffalo.edu/cas/math/ug/ug-courses/syllabi.html

Incomplete grades. See the UB Catalog for the UB incomplete grades policy:

catalogs.buffalo.edu/content.php?catoid=11&navoid=571#incomplete-grades

Academic integrity. See the UB Catalog for the UB academic integrity policy:

catalogs.buffalo.edu/content.php?catoid=11&navoid=571#academic-integrity

Accessibility resources. If you need accommodations due to a physical or learning disability please contact the UB Accessibility Resources Office to make appropriate arrangements:

www.buffalo.edu/studentlife/who-we-are/departments/accessibility.html