Math 313/513 in Spring 2022

Martin Bies

January 18, 2022

Contact

- Instructor: Martin Bies,
- Email: mbies@sas.upenn.edu,
- Office hours: Tuesday, 1-2pm EST (via zoom).
- Grader: Enzo Bergamo,
- Email: ebergamo@seas.upenn.edu,
- Office hours: Monday, 4-5pm EST (via zoom).

Lecture – Generalities

- Lecture times: Tuesday and Thursday, 10:15am – 11:45am.
- Lecture modus: Online via zoom and Canvas until further notice – lecture notes will be provided.
- Webpage:
  - https://catalog.upenn.edu/courses/math/,
  - https://martinbies.github.io/teaching/.
- Textbook: Gilbert Strang, Introduction to Linear Algebra, Fifth Edition (2016), ISBN: 978-09802327-7-6,
- Prerequisites: Math 240 or 260. Elementary programming skills in `Python`.

Lecture – Outline

This course covers topics from linear algebra such as:

- basic notions of linear algebra (vector spaces, linear maps, basis, ranks, ...),
- solving linear equations (Gaussian and Gauss-Jordan elimination, determinant, ...),
- matrix decompositions such as LU, LDU, SVD, ...,
- eigenvectors and eigenvalues, diagonalizability,
- orthogonal transformations, unitary transformations and the spectral theorem.

We exemplify these concepts in applications. These include:

- Markov processes, Markov matrices and steady-state vectors,
- ODEs,
- Fourier analysis,
- linear regression,
- theorem of principal axes in classical mechanics.

Homework

- There will be weekly homework assignments.
- This course has a **computational** focus. The homework assignments will include programming tasks. Basic familiarity with the programming language `Python` is expected.

Exams and grading

All exams are (as of this writing expected to be) in person. The grades will be determined as follows:

- Homework: 30%
- Mid term 1 (tentatively on Thursday, February 10): 20%
- Mid term 2 (tentatively on Thursday, March 17): 20%
- Final exam (tentatively on Tuesday, May 3): 30%

Please acknowledge the following:

- Late homework/exam solutions will not be accepted and count as zero, except for reasons such as serious illness, family emergency, etc. In such cases you must provide documentation and use the *Course Absence Report system* in advance. I retain the right to decide how to handle these cases.
- The *Code of Academic Integrity* will be strictly enforced. Cheating on homework or exams (copying/sharing work with other students, etc.) will result in a score of zero on that work and referral to the *Office of Student Conduct*.

Students with disabilities

Any student requiring special accommodations is encouraged to contact me and the *Office of Student Disabilities Services* as soon as possible.

Important Dates

Thursday, January 13	First class
Tuesday, January 25	Course selection period ends
Thursday, Februrary 10 (tentative date)	Mid term 1
Monday, February 21	Drop period ends
Saturday, March 5 – Sunday, March 13	Spring break
Thursday, March 17 (tentative date)	Mid term 2
Friday, March 18	Grade Type Change Deadline
Monday, March 28	Last day to withdraw from course
Tuesday, April 26	Last class
Thursday, April 28 – Sunday, May 1	Reading days
Tuesday, May 3 (tentative date)	Final exam