DS-GA 1014: Optimization and computational linear algebra for data science
Fall 2021

- **Instructor:** Marylou Gabrié

  - e-mail: mgabrie@nyu.edu.
  - Office hours (on Zoom): Mondays 3-4pm (to be confirmed) or by appointment.

- **Course information**

  - Lecture time and location: Thursdays 4:55pm-6:35pm in Room G08 at 12 Waverly Place.
  - Course website: https://marylou-gabrie.github.io/linalg-for-ds.html

- **Course outline**

  - This course covers the basics of optimization and computational linear algebra used in Data Science. About 66% of the lectures will be about linear algebra and 33% about convex optimization. The first 5 lectures will cover basic linear algebra. Then we will study applications: Markov chains and PageRank, PCA and dimensionality reduction, spectral clustering, linear regression. Lastly, we will go over convex functions, optimality conditions and gradient descent.
  - We will largely follow the outline of last year https://leomiolane.github.io/linalg-for-ds.html.

- **Grade breakdown**

  - Written homework to be (scanned and) submitted as a single PDF file on Gradescope 40%. Homeworks are available on the course's website after the corresponding lecture and usually due on Sundays at 12:00pm of the next week: this let you $\sim$ 10 days to complete it.
  - Midterm examination: 25%.
  - Final examination: 35%.
  - All exams are open books/notes.
  - No extra credit projects will be offered.

- **Homework, quiz and examination policy**

  - The lowest written homework scores will be dropped.
  - Late homework will not be accepted. This includes homework which the file metadata indicates was created before the deadline but which was not submitted on time.
  - Other homework extensions may be granted in cases when the lecturer has good reason to believe that a student may have difficulty completing homework on time even with proper time planning (e.g. joined the course late or prolonged illness). Please e-mail the lecturer well in advance and explain your reason(s) if you would like to request other homework extensions, and note that other homework extensions are not automatically granted.
  - You are permitted to discuss homework with fellow students, but homework must be written in your own words. Please list on your submission the students you work with for the homework (this will not affect your grade).

- Homeworks contain extra-credit problems (indicated with a ⋆).They will not (directly) contribute to your score of this homework. However, for every 4 extra credit questions successfully answered your lowest homework score get replaced by a perfect score.
- The midterm and final exam will be in-person exams in limited time.

- **Computing the course's grade**

  - The grades of the different evaluations will be converted to a $0-100$ scale and averaged:

    $$\text{Course grade} = 40\% \, (\text{Homework}) + 25\% \, (\text{Midterm}) + 35\% \, (\text{Final})$$

  - Your letter grade for the course (the one that will appear on Albert and your transcripts) is then obtained according to:

Grade	Interval
A	≥ 93
A-	$90 \leq \cdot < 93$
B+	$87 \leq \cdot < 90$
B	$83 \leq \cdot < 87$
B-	$80 \leq \cdot < 83$
C+	$77 \leq \cdot < 80$
C	$73 \leq \cdot < 77$
C-	$70 \leq \cdot < 73$
D+	$67 \leq \cdot < 70$
D	$63 \leq \cdot < 67$
D-	$60 \leq \cdot < 63$
F	< 60

  - The grades of the homeworks will not be curved. Only the grades of the midterm and final are going to be curved.

- **In case the course switch to fully remote instruction**

  If for some reason the course has to switch to remote instructions, lectures and recitations will all be on Zoom according to the same schedule. Since homeworks are already 'remote', nothing will change on that side. Format of exams is to be determined in this situation.

- **Academic integrity**

  - You are expected to follow codes of academic integrity as specified by the university and the College of Arts and Sciences:
    * https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/academic-integrity-for-students-at-nyu.html
    * https://cas.nyu.edu/content/nyu-as/cas/academic-integrity.html
    * http://cas.nyu.edu/content/nyu-as/cas/academic-integrity/honor-code.html