Meeting block: K+ (Mon Wed 4:30 - 5:45 p.m.) in BP-7.
Instructor: Alberto López Martín (alberto.lopez[at]tufts.edu)
Office hours: Mon 1:30 - 3:00 p.m., Wed 1:30 - 3:00 p.m. in BP-106, or by appointment.

Teaching Assistant: Alex Babinski (alex.babinski[at]tufts.edu)

**Prerequisites:** Some notions of Linear Algebra at the Math 70\(^1\) or Math 72\(^2\) level, or instructor's consent.

**Text:** There is no recommended text for the course. There will be a list of books that, to some extent, cover the contents of the course available on the Trunk webpage.

**Course Website:** https://trunk.tufts.edu/xsl-portal/site/geometry

**Homework:** Problem sets will be assigned weekly and homework will usually be collected, using folders handed out during the first lecture, each Monday. The first homework is due on January 27. Problem sets will be posted on the website above.

Homework will be handed in in pairs that will be constituted by the instructor. The homework grade will be the same for both members of the group. It is extremely important that you try and do all exercises. You are encouraged to come to office hours for hints and ideas. However, you must submit your own answers showing all of your work.

**Exercise sessions:** There will be weekly exercise sessions held by Alex Babinski, the TA for the course. The time of these meetings will be agreed upon during the first day of classes on January 15 and will start the week after.

**Exams:** There will be two non-cumulative midterm exams

- the first one on Monday, **February 24** from 12:00-1:20 p.m., and
- the second one on Monday, **March 31** from 12:00-1:20 p.m.,

as well as a **cumulative** final exam

- on Friday, **May 2**, 12:00 - 3:00 p.m.

**Grading:** Your score \(S\) in the course is the largest of the following two quantities:

\[
S_1 = .10H + .25M_1 + .25M_2 + .40F
\]
\[
S_2 = .10H + .30M_1 + .20M_2 + .40F
\]

where \(H\) is your homework score, \(Q\) is the sum of all your quiz scores, \(M_1\) is your higher midterm score, \(M_2\) is your lower midterm score, and \(F\) is your score on the final exam.

\(^1\)as in *Linear Algebra and Its Applications* by Lay
\(^2\)as in *Linear Algebra* by Friedberg/Insel/Spence
If you miss a midterm exam for a reason accepted as legitimate by the Department of Mathematics, your course score $S$ would be the largest of these two numbers:

$$S_1 = .10H + .25M + .65F,$$
$$S_2 = .10H + .30M + .60F$$

This score $S$ will be converted into a letter grade according to the conversion chart given on the department website: http://math.tufts.edu/courses/gradingSchemes.htm.

A final word about homework folders: Handwritten problems will be collected using folders handed out in class. Please mark your folder with the course and section numbers as well as an identifier to help you know that it is your folder — something that is likely unique to your section and something that is pronounceable in case your instructor chooses to return homework folders by calling out the identifiers. Please write it as clearly as possible and make sure to tell your instructor well before the end of the semester what your identifier is so credit associated with it can be counted towards your course grade.

Feel free to use your name as your identifier, but expect that unless you are told otherwise, the homework folders are handed off between instructor and grader in a way that does not ensure their confidentiality (usually by way of drawers in the lobby of the Bromfield-Pearson building). Your educational record is privileged information under the federal Family Educational Rights and Privacy Act (FERPA), and using your name as identifier means that you opt out of being guaranteed the confidentiality of the information on and in your homework folder.

Learning Objectives: The course aims to provide students with a solid conceptual foundation in abstract algebra; the course will be taught in accordance with Learning Objectives 1, 2, 3, and 6 as listed at http://ase.tufts.edu/faculty-committees/assessment/math.htm.

Disability Services: If you are requesting an accommodation due to a documented disability, you must register with the Disability Services Office at the beginning of the semester. To do so, call the Student Services Desk at 617-627-2000 to arrange an appointment with Linda Sullivan, Program Director of Disability Services.

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Topics

- Conics
  - Conic Sections and Conics
  - Properties of Conics

- Affine geometry
  - Geometry and Transformations
  - Affine Transformations and Parallel Projections
  - Properties of Affine Transformations
  - Applications of the Fundamental Theorem of Affine Geometry
  - Affine Transformations and Conics

- Projective geometry: lines
  - Perspective
  - The projective plane $\mathbb{RP}^2$
  - Projective transformations
  - Applications of the Fundamental Theorem of Projective Geometry
  - Cross-ratio

- Projective geometry: conics
  - Projective conics
  - Tangents
  - Applying Linear Algebra to projective conics
  - Duality and projective conics