MAT347/644 SPRING 2026

SYLLABUS

Welcome to MAT347/644!

To help get things started, I have assembled below some important information about this course. Please **READ CAREFULLY** and in its entirety. This and more information can be found in the course webpage:

`http://www.lehman.edu/faculty/rbettiol/lehman_teaching/2026mat347.html`

1. **About this course.** This course is different than most other MAT courses you might have taken so far, as it incorporates modern pedagogical principles of active and experiential learning where most of the work is *project-oriented* and *done in groups*, partially using specialized computer software. The main goal is to learn optimization techniques ranging from classical (linear programming, simplex method) to current (semidefinite programming, interior point methods), notions of convex algebraic geometry (polyhedra, spectrahedra, semi-algebraic sets), their interactions, and some "real world" applications and challenges.

2. **Prerequisite.** This course is primarily aimed at Mathematics or Computer Science majors and graduate students. The only required prerequisite is a solid foundation in Linear Algebra, such as MAT313 at Lehman.

3. **Classes.** This is an in-person course, and your ***attendance in person is required in all lectures***, which will be at **Gillet 223, 11:00am–12:40pm**, on Mondays and Wednesdays according to the Registrar's calendar. There is no option available to attend classes online for this course. However, please be mindful of each other's health and well-being so do not come to class if you are feeling sick. If you miss a class or part of a class, please email me so we can discuss the material that was covered and coordinate how to catch up. You can find detailed information on the specific plans for each class in the day-by-day schedule on the course website, which is subject to change but will be always kept updated. Please remember to refresh your browser every time you access the schedule, so that you open the latest version.

4. **Grades.** Course letter grades will be determined based on the following breakdown:
   - 40% In-class exercises, participation, and attendance
   - 20% Group presentation and written report (Project #1): *February 11, 2026*
   - 20% Group presentation and written report (Project #2): *March 11, 2026*
   - 20% Final group presentation and written report (Project #3): *May 18, 2026*

Grades (0-100) for Projects $\#1 - \#3$ will be given ***to each student*** and posted on Brightspace. Not all members of a group need to receive the same grade. ***Absence from a group presentation will result in a zero grade for that student.*** Any requests for grade revision must be submitted in writing (by email).

5. **Group presentations and written reports.** Effectively, these are the equivalent of homework and exams in traditional courses. There will be 3 group presentations during the semester, scheduled as shown above, during the usual class time. On the same day of the presentation, each group will submit a written report, following the instructions that you will receive together with your group project.

6. **Main references.** We will not use a single textbook in this course, rather we will occasionally pick some materials from different references to complement the content covered in lectures, including from:
   - "Elementary Linear Programming with Applications", by Bernard Kolman and Robert E. Beck (AP)
   - "Understanding and Using Linear Programming", by Jiri Matousek and Bernd Gärtner (Springer)
   - "Semidefinite Optimization and Convex Algebraic Geometry", edited by Grigoriy Blekherman, Pablo A. Parrilo, and Rekha R. Thomas (MOS-SIAM Series on Optimization)
     `https://sites.math.washington.edu/~thomas/frg/frgbook/SIAMBookFinalvNov12-2012.pdf`
   - "Semidefinite Programming", by L. Vandenberghe and S. Boyd, SIAM Review, 38(1): 49-95, 3/1996.
     `https://web.stanford.edu/~boyd/papers/pdf/semidef_prog.pdf`

You are not required to purchase a copy of any of the above references.

7. **Websites.** There are 3 important websites you will use for this course:

(A) Course website: `http://www.lehman.edu/faculty/rbettiol/lehman_teaching/2026mat347.html`
(B) Brightspace: `https://brightspace.cuny.edu/`
(C) Wolfram Mathematica: `https://www.wolfram.com/siteinfo/`

8. **Software.** We will often use `Wolfram Mathematica` in class and on some of the projects. Familiarity with this software will not be assumed, but you are encouraged to

- download and install it right now, using your Lehman email in website (C) above;
- read and work through the "Fast Introduction" tutorial available here:
  `https://www.wolfram.com/language/fast-introduction-for-math-students/en/`

For basic reference and syntax of built-in functions, see: `https://reference.wolfram.com/language/`

9. **Office hours (by appointment).** If you would like to schedule a time, either individually or as a group, please reach out before/after class or via email.

10. **Students with disabilities.** Lehman College is committed to providing access to all programs and curricula to all students. Students with disabilities who may need classroom accommodations must register with the Office of Student Disability Services. For more information, please contact the Office of Student Disability Services, Shuster Hall, Room 238, at 718-960-8441.

11. **Academic integrity and class policies.** The highest levels of academic integrity, as detailed in the

(1) CUNY Academic Integrity Policy
`https://www.cuny.edu/about/administration/offices/legal-affairs/policies-resources/academic-integrity-policy/`
(2) Lehman College Undergraduate Bulletin
`https://lehman-undergraduate.catalog.cuny.edu/academic-services-and-policies/academic-integrity`

must be upheld in all activities related to this course. CUNY-wide and Lehman College policies and procedures that are in effect regarding academic integrity, attendance, student conduct, secular and religious holidays, reasonable accommodations and academic adjustments, etc., will be followed strictly. Violations of any academic integrity policies will be referred to the Office of Student Affairs for disciplinary sanctions.