ISYE 7800 OR: Mathematics of Operations Research Fall 2026

Syllabus

Calum MacRury

Instructors: Calum MacRury (calum.macrury@isye.gatech.edu)
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Canvas: The course will be hosted on Canvas. All announcements including those related to homeworks will be posted on Canvas. You should ensure that you are receiving emails every time there is an announcement on Canvas.

Dropbox: HW assignments, solutions, and all other material for the course will be posted on Canvas.

Discussion: There is an 'Ed Discussions' for this course, which can be accessed through Canvas. Ed is the best place to post any questions that you have on the content or homeworks, so that other students or TA or the instructor can answer. Moreover, other students with similar questions will benefit from the discussion. You are strongly encouraged to take part in the discussions on Ed.

Contacting the instructor: If you have general question about the content, homeworks or logistics of the course, you are encouraged to post on Ed. Feel free to also respond to the questions from your friends. If you want to contact the instructors for any other reason, please send an email including [ISyE 8813-OR] in the subject.

Grading:

- Homework - 30%
- Midterm Exam - 35%
- Final Exam - 35 %

Homeworks: Homeworks form a major part of the learning experience in this course. A major component of this course is to learn how to write proofs, and that is possible only by practice through homeworks. HWs can be submitted in groups of two. Note that there may be a HW due on the last day of classes.

- Discussions and Honor Code: It is against the code of conduct to copy the solutions from any source. To learn from each other, you are encouraged to discuss homework with at most one other student. However, you are not allowed to look at their answers, and each person must write up their own solutions independently. You may also use Ed, where you can post any clarification questions, and discuss about some of the harder problems.
- Grading: Assignments will be graded by our TA. On most assignments, only a selected subset of problems will be graded.

- Solutions: We will post the HW solutions after each HW is due. The solutions are shared for your personal use, and to help your learning. You are not allowed to share these with anybody.

Tests: You are allowed to bring one handwritten $8.5'' \times 11''$ sheet (two pages) for the midterm and for the final exam. Note that you should prepare your own cheatsheet. No calculators or other electronic devices are allowed.

We have a policy of no make up exams. Missing an exam will be accommodated only in case of unavoidable emergencies, and the instructors must be notified of the emergency as soon as possible, and an alternate arrangement must be made with the instructors prior to the exam.

If you have any questions about grading on the midterms, you must submit your questions in writing. This must be submitted before the class immediately following the class in which the graded midterms are returned.

Brief Course Description: This course is intended for Ph.D. students in ISyE, and will serve as a preparatory course for the core courses in the PhD program. One of the main goals in this course is to develop mathematical maturity and to learn writing mathematical proofs. The course will cover a sampling of topics including:

- Foundations of Mathematical Proofs
- Introduction to Real Analysis
- Basic Linear Algebra

Reference books:

There is no prescribed text book for the class because different books will be used for different parts of the class. The following references will be useful.

1. Walter Rudin, Principles of Mathematical Analysis
2. MaxWell Rosenlicht, Introduction to Analysis
3. Gary Chartrand, Albert Polimeni, Ping Zhang, Mathematical Proofs: a transition to Advanced mathematics
4. Eric Lehman, Thomson Leighton, Albert Meyer, Mathematics for Computer Science, available for free from MIT OCW at this link.
5. Terence Tao, Lecture Notes of Honors Analysis available online at https://www.math.ucla.edu/~tao/resource/general/131ah.1.03w/
6. Gilbert Strang, Linear Algebra and Its Applications, Cengage Learning; 4th Ed. 2006.

Campus Resources and Honor Code: Check out information about Georgia Tech Disability Services at http://disabilityservices.gatech.edu. You are expected to adhere to the Georgia Tech Honor Code. For more information, please see http://osi.gatech.edu/content/honor-code.