MAT 532
Applied Linear Algebra
Spring 2018
Sean Rostami

Contact

This course meets MWF from 09:30 AM to 10:25 AM in 100 Carnegie Building. Sadly, there is no Recitation for MAT 532. My Office Hours are Wed 10:45 AM to 11:45 AM, Thu 09:00 AM to 10:15 AM, and Fri 01:15 PM to 02:15 PM. *These times are deliberately non-uniform, to increase the chance that every student can visit at least once per week.* If you cannot attend any of these, please contact me for a special appointment. My email is sjrostam@syr.edu, and my office is 313C Carnegie Building.

Logistics

I will use Blackboard to host documents, communicate, and store grades. Be sure that you can operate Blackboard and that you can send/receive email via your @syr.edu address. If you have trouble with either of these things, please feel free to visit me for help. *You are expected to check email and Blackboard at least once per day.*

Content

Our textbook is *Linear Algebra and its Applications* (3rd Edition) by Strang. We will cover most of the book, with some sections omitted for lack of either time or interest, and some other things that are not in the book at all. Very broadly, the topics are *LU-Factorization, Algorithmic Complexity, Floating-Point Representation, Pivoting Strategy*, *Least-Squares Technique*, *QR-Factorization*, *Eigenvalue Approximation*, *Condition Numbers*, *Singular Value Decomposition*. If we have extra time, I hope to do some Graph Theory.

Coursework

Homework will be assigned after most lectures, and due the following lecture. A short quiz will occur in some lectures. The pattern and frequency of quizzes will vary, depending on the completeness of our knowledge and my personal feeling. The topic of the quiz can be anything up to and including the previous lecture, although obvious sources of questions for the quiz are the previous lecture and the previous homework. All exams will be “in class”, without books/notes.

Technology

Real-world Linear Algebra is done with the aid of a computer, but no amount of computation is useful if you don’t know how to start or don’t understand the results. So, we will sometimes employ a computer for mechanical but time-consuming procedures and focus more on (a) clear mathematical statements of questions, (b) how to interpret the results of a complicated mathematical process. In other words, we focus more on the beginning and end of a problem than the middle. Although MATLAB is a good environment for what we want to do, there is a lot of overhead and it is impractical to use it during exams. Instead, we will use Graphing Calculators, which can already perform many important basic operations (e.g. Matrix-Multiply, RREF) and can be programmed to perform others (e.g. Gram-Schmidt, Power Method). Many of you already own such a calculator, but the Carnegie Library has dozens of such calculators available to borrow. You will need these for some homework, some quizzes, and some exams. I will occasionally use MATLAB myself in class to illustrate something.

Scoring

Categories of work, and their relative weights, are:

- Homework (≈ Daily) 13%
- Quiz (varying) 12%
- Imperatives 05%
- Midterm 1 (≈ Feb 26) 20%
- Midterm 2 (≈ Apr 02) 20%
- Final Exam (May 08) 30%

The Final Exam is cumulative and will occur from 5:15 PM to 7:15 PM. The location of the Final Exam is not yet known. The Imperatives category will be explained by me on the first day. The assignment of letter grades to scores will approximate the usual Syracuse University standard.

Advice

It is important that you complete the homework with minimal assistance. “Assistance” includes solution manuals, the internet, tutors, friends, and the textbook (if used only to copy examples). It is difficult, but necessary, to resist these opportunities. In reality, you rarely see mathematics exactly as you see it in a course like this – otherwise, “WolframAlpha user” would be the only job. Instead, you must adjust and transport ideas to new situations. The only way to do this, a delicate and subtle business, is to understand every detail of our version. The only reliable way to know every detail is to struggle through it.

Disabilities

The Office of Disabilities Services (ODS) should be contacted by any student who may need academic accommodations. Upon registration at ODS, documents will be issued which should be provided to instructors. It is also encouraged to discuss such needs with the instructor at the beginning of the semester. Such accommodations and services are not provided retroactively, so it is important to contact ODS as soon as possible. More information is available at http://disabilityservices.syr.edu.

Religion

The Religious Observance Policy protects the rights of students, faculty, and staff to observe religious holy days according to their tradition. Under the policy, students are provided an opportunity to make-up any coursework missed due to religious observance, provided that they notify instructors of such before the end of the second week of class. This notification may also be accomplished online, via mySlice. More information is available at http://supolicies.syr.edu/studs/religious_observance.htm.

Integrity

Syracuse University’s Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University’s academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice. The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in failure regardless of violation level. For more information and the complete policy, see http://class.syr.edu/academic-integrity/.