

Math 480 Math Senior Seminar Syllabus
Agnes Scott College, Spring 2021
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The class is hybrid, in person and through Canvas and Zoom. If you have any technology issues (wifi, Zoom, Canvas, etc.), just let me know and we'll figure out something that will work for you.

All times are Atlanta (US Eastern) time zone.

Office hours: Mon 2:00-3:00, Tues 10:00-11:00, and by appointment. On Zoom - links on Canvas.

Required material: We will use several free online textbooks. Details are on Canvas.

Class structure: (Details and links on Canvas.) The class will meet in-person and also be live on Zoom; you can choose which works best for you. (Zoom class meetings will be recorded and posted on Canvas. To preserve the integrity of the classroom experience and to protect students' privacy, which we are legally required to do, only students registered in the course may attend a Zoom class meeting.) There will also be online discussion on Canvas - each week, you are required to post at least one comment, and respond to another student's comment

Plan: We'll cover topics in applied linear algebra (clustering, Markov chains, PageRank, least squares, principal component analysis), and you will write and present a final project on a subject of your choice (an application of the above techniques, or another topic). There's a more detailed schedule below, but it's subject to change.

Homework: There will be 5 or 6 homework assignments throughout the semester, to be turned in online. The details will be on Canvas.

Final project: You will turn in a 5-10 page paper and give a presentation on a math topic. The topic can be related to material covered in class (for example, an application of some of the techniques we learn), but it doesn't have to be. Part of the project will be a proposal and a draft. The details will be on Canvas.

Honor code and group work: All students are expected to follow the honor code throughout the semester; all exams and assignments should be pledged.

I strongly encourage you to work on the homework in groups. I suggest that you work on the problems by yourself first, making a note of anything giving you trouble; then meet with your group and work through the remaining problems together; and finally submit the solutions by yourself. Every group member must submit her own solutions independently; just copying the group's answers is plagiarism and is unacceptable.

Getting help: Chances are that sooner or later you'll get stuck on something, so don't get frustrated. Think hard, and if you're still stuck, do something else for a while. (It's amazing how often that works.)

My office hours are above - these are times when I'm guaranteed to be sitting around on Zoom waiting to talk to someone. If you want to see me at other times, please let me know and we'll find a time.

Finally, I can't emphasize enough that your classmates are your best source of help.

Course goals:

- Learn some tools and techniques of applied linear algebra, and their application in both mathematical and scientific contexts
- Apply and extend your mathematical knowledge through an individual project.
- Enhance your analytic (problem solving) skills, your ability to think abstractly and to analyze critically, and your computational (algebraic) skills
- Learn to communicate mathematics effectively, both orally and in writing

Dates and deadlines:

Project proposal: Wed. 3/3.

Project paper draft: Wed. 4/14.

Project presentations: Wed. 4/28 and Wed. 5/5.

Project paper: Wed. 5/5.

No final exam.

Assessment: Homework 30%, weekly discussion participation 10%, final project 60% (10% proposal, 10% draft, 20% presentation, 20% paper).

Late work: Late work won't be accepted, and you won't be allowed to make up missed exams, except under very exceptional circumstances (e.g., the sasquatch attacks - and even then you should get a note from the sasquatch). In the case of a conflict that you absolutely can't resolve (for example, a religious holiday), you may arrange to take a midterm exam early.

Attendance and participation: I expect you to be at every class meeting, either in person or on Zoom, on time, unless you've talked to me about having to be absent for technological or other reasons. However, tardiness or absence will have no (direct) effect on your grade. Participation in the weekly discussions on Canvas is required,

Date	Topic
Wed 1/20	1 Introduction
Wed 1/27	Vector spaces and distance (Hefferon 1.II.2)
Wed 2/3	Clustering (Boyd & Vandenberghe Ch. 4)
Wed 2/10	More clustering
Wed 2/17	Eigenvectors (Selinger Ch. 8)
Wed 2/24	Markov chains (Nicholson 2.9)
Wed 3/3	More Markov chains. Project proposal due.
Mon 3/8 - Tues 3/16	Journeys/Peak Week/Spring Break
Wed 3/17	PageRank (Hefferon 470-473)
Wed 3/24	Least squares (Nicholson 5.6)
Wed 3/31	No class meeting - work on final project

Date	Topic
Wed 4/7	No class meeting - work on final project
Wed 4/14	Principal Component Analysis (Selinger 11.12). Project paper draft due.
Wed 4/21	More PCA
Wed 4/28	Project presentations.
Wed 5/5	Project presentations. Final paper due.

Course evaluation: Your feedback on the course is extremely valuable to me, the math department, and the administration. In particular, I take your comments very seriously and use them to improve the course the next time I teach it. You are responsible for completing an evaluation of the course at the end of the semester.

Title IX: For the safety of the entire community, any incidence of or information about sexual misconduct must be reported immediately to Title IX Coordinator Marti Fessenden (mfessenden@agnesscott.edu, 404-471-6547) or Deputy Title IX Coordinator Karen Gilbert (kgilbert@agnesscott.edu, 404-471-6435).

Inclusion: This course adheres to the principles of diversity and inclusion integral to the Agnes Scott community. We respect people from all backgrounds and affirm people's decisions about gender expression and identity. Please let me know your preferred name or gender pronoun if different from the class roster. The Gay Johnson McDougall Center for Global Diversity and Inclusion is centered and grounded in dismantling systems of oppression, including structural and systemic racism, as well as empowering each individual to take action that uplifts and builds community. Students can contact them at diversity@agnesscott.edu or 404.471.6118.

ADA: Agnes Scott College seeks to provide equal access to its programs, services and activities for people with various abilities. If you will need accommodations in this class, please contact the Office of Academic Advising and Accessible Education (404-471-6150) to complete the registration process. Once registered, please contact me so we can discuss the specific accommodations needed for this course.