



MAD 6406 (F20) Syllabus

General Information

Instructor: Dr. Sara Pollock

email: s.pollock@ufl.edu,

office: LIT 444

fall 2020 office hours: W Period 9 (4:05-4:55p), or by appointment (fall 2020 office hours will be virtual)

(Scheduled) Class Time and Location

M W F Period 8 (3:00-3:50p)

Class delivery will be semi-synchronous: lectures will be pre-recorded and posted.

Friday classes will be **synchronous** and feature student presentations of material.

Additional synchronous classes for final project presentation will take place during scheduled class meeting times, and **will be announced in advance**.

Required Text

Numerical Linear Algebra, L. Trefethen and D. Bau, III. Published by SIAM: Society for Industrial and Applied Mathematics, 1997.

Highly Recommended Text

Matrix Computations, G. Golub and C. Van Loan. Published by The John's Hopkins University Press (third edition, 1996).

Description and Goals

Description. (Credit hours: 3), Topics most useful in applications with emphasis on numerical techniques: systems of linear equations, positive definite and Toeplitz systems, least squares problems, singular value decomposition, and eigenvalues. Numerical stability and efficiency of algorithms as well as effect of perturbations on the problem. Companion to MAD 6407.

Topics.

Fundamentals and the SVD (Ch 1)

QR Factorization and least squares (Ch 2)

Conditioning and Stability (Ch 3)

Systems of Equations (Ch 4)

Eigenvalues (Ch 5)

Iterative methods (Ch 6) as time permits.

Goals. Understand the mathematical framework of basic matrix decompositions used in numerical analysis and scientific computing.

Prerequisites. MAS 3114, 4105, or 4124 (Linear Algebra); and programming language.

Grading Policy

Grades will be calculated according to the following percentages ('+' and '-' may be assigned at upper and lower ranges of each grade):

Midterm Presentations	15%	90%-100%	A
Homework	60%	80-89%	B
Final Exam/Final Project	25%	70-79%	C
		60-69%	D
		<60%	F
Total	100%		

Homework. Problem sets will be assigned regularly. You are welcome to discuss problems with each other and/or with me, but the solutions you turn in must be your own. Any code turned in must be your own. You are discouraged from searching the internet for solutions. If you do refer to an outside source, you should cite that source. Wikipedia, blogs and tutorial websites are not valid sources.

Some problems will include writing basic matlab code. In some cases I may ask you to submit the code (by email) so that I may run it. Not all problems will be graded on all homeworks; homework grades will be assigned based on a combination of completeness (attempting all problems), and on your solutions to those explicitly graded.

Midterm Presentations. Each student will present two homework problems over the course of the semester, during synchronous class sessions. This can be done after solutions are posted. The two problems do not have to be presented during the same session. A schedule for problem presentations will be posted.

Final Exams. There will be a comprehensive final exam designed as preparation for the qualifying exam. This will be a take-home exam. The work is expected to be your own, and you will receive a zero on the entire exam if it is not. Exam dates will be posted.

Final Projects. Students may opt to do a final project in place of the final exam. The project should either explore some topic covered in this class in greater depth, or it may explore how one or more topics from this class relate to a topic of interest from outside this class. Projects may also be based on talks given on the [E-NLA seminar](#). Students planning to take the Ph.D. or first year exams are strongly encouraged to take the final exam. All other students are strongly encouraged to consider the project.

Class Policies

Symbolic Math. The focus of the class is on the basic computational algorithms in floating-point arithmetic used in scientific computation. Generally, you may not use the symbolic math toolbox (or use matlab commands including “sym”, “syms,” “symfun,” “symsum,” “symprod,” etc.) on any homework or exam question. We may use it on occasion for comparison.

Attendance. Attendance at synchronous sessions is encouraged.

Computers. There may be times a computer is necessary for the homework and take-home exams, as required. It is suggested that you program in Matlab or Python. C, C++, Fortran are acceptable, too.

Cell phones. Please don't use your cell phone during class. Phones and all electronic devices should be turned off during exams.

Make-up/late work. Make-up exam work is allowed only when written evidence of an official University excused absence is provided. Notification in writing (acknowledged email is acceptable) prior to the date of the absence is required. In cases where this is not feasible, the student must provide documentation by the end of the second working day after the absence. If these conditions are met, then the percentage grade earned on the final exam will be substituted for a missed exam.

Academic Integrity

Honor Code. UF students are bound by The Honor Pledge which states,

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied:

“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

The Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. You can find the honor code here: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/> If you have any questions or concerns, please consult with the instructor.

I take academic integrity very seriously. If a homework solution or take-home portion of an exam you turn in is not your own work as outlined above, you will receive a zero on that assignment. If multiple assignments

are found not to be your own work, you will receive an F in the class.

SUGGESTION. Seek outside help on a problem only after thinking about it for at least 40 minutes.

Additional UF Policy Information

UF Policy on recorded classes [Our synchronous classes in MAD6406 will not be recorded] Our class sessions may be audio-visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate verbally are agreeing to have their voices recorded.

If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the “chat” feature, which allows students to type questions and comments live. The chat will not be recorded or shared.

As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

UF Policy on Grade Points. Grading will be in accord with the UF policy stated here:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Class Attendance. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found here:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Accommodations for Students with Disabilities. Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc/>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

U Matter We Care. Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392- 1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Contact information for the Counseling and Wellness Center. <https://counseling.ufl.edu/>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Online Evaluations. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Diversity, Equity and Inclusion Statement. The Mathematics Department is committed to diversity and inclusion of all students. We acknowledge, respect, and value the diverse nature, background and perspective of students and believe that it furthers academic achievements. It is our intent to present materials and activities that are respectful of diversity: race, color, creed, gender, gender identity, sexual orientation, age, religious status, national origin, ethnicity, disability, socioeconomic status, and any other distinguishing qualities.



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