

43503/53903: Numerical Linear Algebra

MATH 43503-001 & MATH 53903-001 — Spring 2026

Instructor Information

Name: Dr. Chen Liu

Office: SCEN 218

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Office Hours: 14:00 PM – 17:00 PM on Wednesday or by appointment.

Class Information

Days and Times: MWF 09:40AM - 10:30AM

Classroom: Science Engr Classroom 322

Course Description

This is an introduction course to numerical linear algebra in computational mathematics. Learning objectives include: numerical methods for problems of linear algebra, solving large linear systems, eigenvalues, and eigenvectors.

Learning Resources

Textbook: Lloyd N. Trefethen, David Bau: *Numerical Linear Algebra*. SIAM, 1997.

Other supplementary materials include:

- Yousef Saad: Iterative methods for sparse linear systems (2nd edition), SIAM, Philadelphia, 2003.
- [*Lecture Notes*](#) by Matthias Heinkenschloss

[Blackboard Learn](#) The Blackboard course page will be a source of communication to you aside from class. There, you will find notes, supplemental studying material, and some important announcements.

Schedule of Course Topics

A tentative course schedule is listed below, which may be subject to change depending on class progress. The detailed weekly schedule will be posted on Blackboard.

1. Fundamentals (Chapter 1)
2. QR Factorization and Least Squares (Chapter 2)
3. Conditioning and Stability (Chapter 3)
4. Systems of Equations (Chapter 4)
5. Eigenvalues (Chapter 5)
6. Iterative Methods (Chapter 6)

Homework

The homework assignments focus on analyzing theoretical questions but may include a mix of programming. The programming languages such as C/C++, Fortran, MATLAB, Python, Julia for solving the mathematical problems are accepted. Homework problem sets with due dates will be posted on [Blackboard Learn](#). Late homework may be accepted with penalty of score. You are encouraged to talk to other students on problems, but you must submit your own solutions.

Midterms and Final exam

There is a midterm (in-person) exam scheduled to be held in the Science Engr Classroom 322. The dates and locations of the exams are subject to change based on class progress.

	Date	Time	Location
Midterm	Wed 03/04, 2026	09:40 - 10:30	in class

Final exam location, date and time: TBA.

Grading Scale

Students who get at least 90% of the total points in this course are guaranteed an A, 80% guarantees a B, 70% a C, 60% a D, and less than 60% an F; for each of these grades, it's possible that at the end of the semester a somewhat lower percentage will be enough to get that grade. The performance assessments will be based on

Homework assignments	40%
Project and presentation	10%
Attendance or quizzes	10%
Midterm exam	15%
Final exam	25%
TOTAL	100%

For exams: You will need to bring your UA Student ID and a pencil. NO calculators, books, notes, phones, or cameras are allowed in the exams. Turn off or put away all electronic devices. Regulations for each exam will be posted prior to the exam date.

Make-Up Exam Policy

No make-up examinations will be given without an approved excused absence. To be excused you must notify the instructor by email prior to date of absence if such notification is feasible. It is the student's responsibility to schedule a makeup within one week of the exam date.

Attendance Policy

This course follows the University of Arkansas academic regulations regarding [attendance](#), which states that students are expected to be present for every meeting of the classes in which they are enrolled. Attendance will be taken at the beginning of each class and lateness will be

noted. When conflicts or absences can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency absences when advance notification to the instructor is not possible, the student should contact the instructor as soon as possible by email or phone.

Updated Drop/Add calendars

For the important dates, such as the last date to drop without *W* and last date to drop with *W*, please refer to the University of Arkansas [2025-26 Academic Calendar](#).

Etiquette

Students and instructors each have an important role in maintaining a classroom environment optimal for learning, and are expected to treat each other with respect during class, using thoughtful dialogue, and keeping disruptive behaviors to a minimum. Both students and faculty perceive abusive language directed towards others as the most disruptive behavior. Other behaviors that can be disruptive are chatting and whispering during class, the use of smartphones or laptops for texting or in other ways unrelated to the course, preparing to leave before class is over, and consistently arriving late to class. Inappropriate behavior in the classroom may result in a request to immediately leave the classroom and/or a referral to the Office of Academic Integrity and Student Conduct.

Academic honesty

Academic dishonesty will not be tolerated. “As a core part of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail.” Each University of Arkansas student is required to be familiar with and abide by the University’s Academic Integrity Policy, which may be found [here](#). Students with questions about how these policies apply to a particular course or assignment should immediately contact their instructor.

Electronic Devices

Cell phones, iPads, or any device that may distract from the class should be turned off before class begins unless instructed otherwise and may not be on the desk during class or tests.

Inclement Weather Policy

Class will meet unless the University is closed. On-campus students are expected to be present. Off-campus students should make their own decisions in the best interest of personal safety. Off-campus students will not be penalized for being absent on those days the Fayetteville Public Schools are closed due to weather. If attendance is severely affected by weather, deadlines and exam dates may be adjusted. Please do not call the Department of Mathematical Sciences with weather-related inquiries. You may contact me for information.

Accommodations

Under University policy and federal and state law, students with documented disabilities are entitled to reasonable accommodations to ensure the student has an equal opportunity to perform in class. If any member of the class has such a disability and needs special academic accommodations, please report to the Center for Educational Access (CEA). Reasonable accommodations may be arranged after the CEA has verified your disability. Students who are registered with the Center for Educational Access must meet with the instructor by the end of the first week of class, or within one week of registering with CEA to discuss their accommodations. This must be done before you utilize your accommodations. Do not hesitate to contact your instructor if any assistance is needed in this process.

Communication

The best way to communicate with me (beyond coming to my office hours) is by email. You can expect a reply within 24 hours, excluding weekends and holidays. Students are expected to monitor their uark email address regularly and consult the course Blackboard site for important announcements.

Intellectual Property

Notes, review material, exams, quizzes, videos or other learning material used in this class are the intellectual property of the instructor. Selling or freely sharing this content in electronic or written form is a violation of intellectual property rights and also constitutes a violation of the University's academic integrity policy. Your continued enrollment in this class signifies your understanding of and your intent to abide by this policy. There are severe consequences for sharing class content online.

Emergency Procedures

Many types of emergencies can occur on campus; instructions for specific emergencies such as severe weather, active shooter, or fire can be found at [link](#).

Health and wellness

Related information can be found through the following [link](#)

Grade Disputes

The instructor is committed to keeping students informed of their standing in the class. Scores on all graded items will be posted in a timely manner. Students are expected to bring any possible errors to the attention of the instructor within one week of posting. This maintains an accurate grade record throughout the semester. All scores posted before Dead Day will be deemed accurate unless a possible error is brought to the attention of the instructor before the scheduled final exam.

Class Cancellation Policies & Procedures

Class cancellation by the University due to inclement weather-related delay/closure: In the event of an inclement weather delay, early dismissal, or closure, your instructor may conduct class through synchronous distance instruction (i.e. remote instruction) at the scheduled class time while the campus is closed for inclement weather but will not require a student to attend synchronously. Any class taught remotely while the campus is closed for inclement weather will be recorded and made available to all students in the class in the approved campus Learning Management System. Your instructor will provide students the opportunity to make up work due while the University is closed for inclement weather without penalty. If remote instruction is not used, the instructor will cancel class meetings altogether. Instead, alternative learning materials and assignments will be supplied, to make up the missing class days.

Faculty absence due to medical or other emergency: Every effort will be made to arrange for a substitute if your instructor must take an emergency leave. If a substitute cannot be arranged, then your instructor may choose to teach classes remotely when they are able to do so, subject to appropriate university policies on remote instruction. If your instructor cancels class in case of an emergency (allowed per university policy <https://provost.uark.edu/policies/185810.php>), then your instructor will make up missed class time using recorded lectures, assignments, readings, instructional materials, or other alternative forms of instruction. Your instructor will send announcements promptly via email and posted to Blackboard. Each student will also get the opportunity to make up work that is due if class is impacted by an emergency.

Disclaimer

This syllabus is subject to change. Please check the [Blackboard Learn](#) page for the most recent version.