

MATH 322 MATRIX ALGEBRA FALL 2024¹

PROFESSOR MARGARET READDY
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OFFICE HOURS: To be announced and by appointment.
Math Dept. Staff: 859-257-3336

LECTURES: MWF 9 am Lafferty Hall 201C

<http://www.math.uky.edu/~readdy/322>



TEXT: David Lay, *Linear Algebra and Its Applications*, 6th edition.

You may also use an earlier edition of the text, keeping in mind the homework problems, the numbering of the problems and the number of authors may have changed.

MATERIAL: Chapters 1 through 7. Some material will be omitted.

PREREQUISITE: Math 114 Calculus II

COURSE DESCRIPTION:

In this course we will focus on the algebra of matrices. Topics include vector spaces, solving linear equations, matrix factorizations, determinants, eigenvalues and eigenvectors, diagonalization, inner product spaces, Gram-Schmidt and symmetric matrices.

EXAMS:

There will be two in-class exams tentatively scheduled on Friday, October 18, 2024 and Friday, November 15, 2024.

FINAL EXAM:

Wednesday, December 18, 2024 from 8:00 am - 10:00 am.
The final exam is cumulative.

CLASS PARTICIPATION:

You are expected to attend every class and be engaged during class – by being prepared for class (reading, doing homework, taking notes, etc.), asking questions, answering questions, giving constructive advice, etc.

You are allowed two unexcused absences with no penalty. Each additional unexcused absence will result in losing 1/5 of your Class Participation grade.

¹aka Official name and number: MA 322 Matrix Algebra and Its Applications. Almost every other university calls this course Linear Algebra

HOMEWORK:

Homework is due before class one week after I lecture on a particular section. Late homework is not accepted. All homework is submitted via canvas using pdf format.

Students are encouraged to form study groups and discuss homework and the course material with each other. However, the homework you submit to be graded should be your own work. If you work with someone on a particular problem(s), clearly indicate this in your write-up.

The homework will be graded on completeness (10 points) and the starred problems on accuracy (5 points each). The maximum you can receive on any homework assignment is 20 points.

Your name should be on your homework. Please scan your homework, label it as HW#. #. YourName.pdf, where #.# indicates the chapter and section of the homework, and upload it to canvas. If you would like your beautiful solutions to be posted on our website, please write a short note on your homework saying, "Permission is granted to post on class website".

QUIZZES:

A short quiz will be given during the last fifteen minutes of each Friday lecture. This will cover material and homework from the previous week's Monday, Wednesday and Friday lectures.

The lowest two quiz grades will be dropped. If you miss a quiz due to an absence (excused or not), this will be one of the two quiz grades which will be dropped.

GRADING:	Class Participation 10%
	Homework 15%
	Quizzes 10%
	Exam 1 20%
	Exam 2 20%
	Final Exam 25%

GRADING SCALE:	Each component of your coursework (class participation, homework, quizzes, exams, final project) will be curved using the scale:
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A 90-100%, B 80-89%, C 70 - 79%, D 60-69%, E Below 60%.

Pluses will be awarded if you are at the upper end of a particular grade, while minuses for being at the lower end.

TITLE IX, DISCRIMINATION AND HARASSMENT:

Title IX is a Federal law that prohibits discrimination and harassment on the basis of sex. In accordance with this law, the University of Kentucky is committed to providing a safe learning, living, and working environment for all members of the University community. The University maintains a comprehensive program which protects all members from discrimination, harassment, and sexual misconduct.

For complete information about the University of Kentucky's prohibition on discrimination and harassment on aspects such as race, color, ethnic origin, national origin, creed, religion, political belief, sex, and sexual orientation, see Administrative Regulation 6: Policy on Discrimination and Harassment <https://regs.uky.edu/administrative-regulation/ar-61>.

ABSENCES:

Administrative Regulation - Academic and Student Rule AR-ASA 5.2.5.2 The current rules defines acceptable reasons for excused absences to include: (a) significant illness of student or serious illness of member of student's household/ immediate family, (b) death of immediate family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the professor. You must present full documentation in order to request makeup work for a valid absence. The instructor will require "appropriate verification" when students claim an excused absence of any kind. Appropriate notification of absences due to University-related trips or a major religious holiday is required no later than 7 days prior to the absence.

If you miss more than one-fifth of the scheduled lectures due to *unexcused* or *excused* absences, the instructor will request that you withdraw from the course.

CHEATING:

Don't do it. It is an extremely serious offense. As a minimum response, I will give a zero to the offender on the assignment/exam/quiz/etc.

DEVICES:

No digital devices (cellphones, computers, calculators, etc), books, notes or outside assistance of any kind including online software/calculator/assistance tools, are allowed during quizzes and/or exams. By University policy the use of such constitutes cheating.

PLAGIARISM: Plagiarism includes copying from outside sources, including internet sources. If charged, at minimum you will receive a zero. Maximum penalties include being suspended, dismissed or expelled from the University. For further information, consult the UK Administrative rules.

CLASSROOM

DECORUM: Code of Student Conduct (AR 4.10), Section V, Letter F, Instructional Setting Behavior: ²

"Students who engage in conduct that results in disruption of an instructional setting may be directed by the instructor to leave the class for the remainder of the instructional setting period."

Examples include but are not limited to reading email during class, texting, taking phone calls, updating your favorite social media page, using a fidget spinner, reading the newspaper, interrupting classmates and speaking aloud without being called upon. An attitude of respect for and civility towards other students in the class and the instructor is expected at all times. If what you are doing would be inappropriate behavior on a job interview, then it is very likely inappropriate behavior in the classroom.

INTELLECTUAL PROPERTY **All course content, including, but not limited to handouts, assignments, live and recorded lectures, lecture notes, syllabus, review materials, quizzes, exams, and webpages, is the intellectual property of the instructor.**
The instructor is the exclusive owner of all course materials. Course content cannot be shared in any way with anyone or with anything. Course content also cannot be uploaded, reproduced in any medium or sold without prior permission from the instructor.

Course meetings and lectures may be recorded by the instructor. All video and audio recordings of lecturers and class meetings, provided by the instructor, are for educational use by students in this class only. They are not to be copied, shared, uploaded to other online environments or redistributed in any manner.

PHOTOGRAPHY & RECORDING BY STUDENTS Video and/or audio recordings are not permitted unless a student has received prior permission from the instructor. Recording of other students by student(s) is prohibited per the UK Code of Student Conduct. Any distribution of recordings is also prohibited. Students with specific recording accommodations approved by the Disability Resource Center should present their official documentation to the instructor.

Any violation of the class photography & recording policies will result in your final course grade being reduced by one letter grade as a minimum penalty.

STUDENTS WITH DISABILITIES: Students with disabilities should provide your instructor with a Letter of Accommodation from the Disability Resource Center. The DRC can be reached via phone (859-257-2754) or email (drc@uky.edu).

OTHER MISCELLANEOUS ITEMS FROM THE PROVOST CHECKLIST:
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Unless noted, office hours will be held in Prof. Readdy's office.

Course description: Algebra of matrices, elementary theory of vector spaces and inner product spaces, the solution of simultaneous linear equations using Gaussian elimination and triangular factorization. Orthogonal projections, pseudo inverse and singular value decomposition, least squares approximation. Determinants, eigenvalues and eigenvectors, diagonalization.

Administrative Regulation - Academic and Student Affairs AR-ASA 5.25 Academic Standards
This 192 page document is posted on our course website.

Helpful resources at the Office of Student Success: <https://studentsuccess.uky.edu/get-help>

What is Plagiarism? <https://ombud.uky.edu/students/what-plagiarism>

What is Cheating? <https://ombud.uky.edu/students/what-cheating>

Classroom Emergency Preparedness and Response Information: See our course website for this document.

The instructor reserves the right to modify this syllabus at any time.

Last updated August 27, 2024.

PROF. READDY'S ADDENDUM PROHIBITING THE USE OF GENERATIVE AI (GENAI)

EFFECTIVE DATE: AUGUST 15, 2024

READ THIS! IT IS IMPORTANT!

A major focus of this course is to develop your mathematical skills and knowledge of linear algebra. **All assignments for this course, unless otherwise indicated, must be completed for this course without the use of AI, calculators, problem solving technologies, etc.**

This policy is to ensure academic integrity, fairness and learning outcomes of the course.

PROHIBITIONS INCLUDE:

- You may not copy from any online sites (Examples: Course Hero, Chegg.)
- You must not utilize problem-solving technologies and/or composition technologies (Examples: ChatGPT, WolframAlpha, matrixcalc.org or other GenAI software)
- Work submitted, including drafts, final versions, and all other submissions, must be written by the student themselves. Sources must be cited for all written assignments.
- Any use of these sites or tools will be considered academic misconduct. You will be charged and penalized per the course's Plagiarism rules.

Please contact your instructor if you have any questions or concerns regarding this policy.

By signing below, I acknowledge that I have read, understood and will abide by the terms of this addendum.

Signed _____ Date _____

Name _____ Last 4 digits of student id _____

Olivia Stowell's AI/ChatGPT Policy (an abbreviated version)

The use of ChatGPT or any other AI platform or tool to generate ideas, solutions (not including spell check), or to produce any material is **prohibited** in this course.

Why this policy?

- **Using AI opens up academic honesty issues.** It raises the question of whether the work is your work. Tools like ChatGPT rely on taking uncredited See Matilda Battersby, Academic authors 'shocked' after Taylor & Francis sells access to their research to Microsoft AI The Bookseller News, July 19 2024. <https://www.thebookseller.com/news/academic-authors-shocked-after-taylor-francis-sells-access-to-their-research-to-microsoft-ai>
- **Using AI does not produce reliably accurate results.** See

Michael Townsen Hicks, James Humphries and Joe Slater, ChatGPT is bullshit, Ethics and Information Technology, volume 25, article 38 2024. <https://link.springer.com/article/10.1007/s10676-024-09775-5>

Alkaissi H, McFarlane S I (February 19, 2023) Artificial Hallucinations in ChatGPT: Implications in Scientific Writing. Cureus 15(2): e35179. doi:10.7759/cureus.35179 in-chatgpt-implications-in-scientific-writing!

Benjamin Weiser, Here's what happens when your lawyer uses ChatGPT, The New York Times, May 27, 2023.

- **ChatGPT has serious negative environmental impacts, particularly in relation to water usage.** See

Molly Flanagan, AI and environmental challengers, University of Pennsylvania's Environmental Innovations Initiative

Matt O'Brien and Hannah Fingerhut, Artificial intelligence technology behind ChatGPT was guilt in Iowa – with a lot of water, September 9, 2023, AP News.

John Naughton, Why AI is a disaster for the climate, The Guardian.

Craig Hale, ChatGPT is having a really bad impact on the environment, techradar Pro.

- **OpenAI and other AI companies have exploited workers from the global south, especially workers in prisons and refugee camps, and workers in Kenya, the Philippines, Columbia and elsewhere.** See Billy Perrigo, OpenAI used Kenyan workers on less than \$2 per hour to make ChatGPT less toxic, time, January 18, 2023. <https://time.com/6247678/openai-chatgpt-kenya-workers/>

Also:

<https://www.wired.com/story/millions-of-workers-are-training-ai-models-for-pennies/>

<https://theconversation.com/long-hours-and-low-wages-the-human-labour-powering-ais-development-217038>

<https://www.washingtonpost.com/world/2023/08/28/scale-ai-remotasks-philippines-artificial-intelligence/>

<https://www.noemamag.com/the-exploited-labor-behind-artificial-intelligence/>