

Math 309

Matrix Algebra

Section 2

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Fall 2021

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Class Hours: MWF 4:00-4:50pm

Room: Hillman/60

Office Hours (tentative): Tuesday 3:00-4:00 PM and 5:30-6:30 PM, Thursday 3:00-4:00,
Monday 3:00-4:00 PM (Zoom links are posted on Canvas.)

Course website: I use Canvas as the main place to post materials related to the course.

You may find some of the materials in the link below:

<https://www.math.wustl.edu/~adaemi/matrix-algebra.html>

Course Overview

This is an introductory course in linear algebra. Linear algebra has many applications in most sciences and fields of engineering as it provides efficient tools to model various phenomena. Our original motivation in this course is to study solutions of a system of linear equations. Motivated by this goal, we develop several important notions in linear algebra that include:

- systems of linear equations,
- matrix operations and row reduction,
- linear independence, dimension and rank,
- introduction to abstract vector spaces and change of basis,
- determinants,
- eigenvalues, eigenvectors and diagonalization,
- inner product spaces, orthogonality, symmetric matrices and the Gram-Schmit Proces,
- least-squares problems.

Although I don't keep track of attendance, I would expect you to attend the class regularly. The prerequisite for this class is Math 132. Familiarity with Math 233 (Calculus III) will be helpful.

Course Textbook

Our primary reference for the class is:

Title: *Linear Algebra and its Applications*
Authors: *David Lay, Steven Lay, and Judi McDonald*
Edition: *5th*

Each lecture of the class is based on one or more sections of the textbook. I strongly recommend reading the relevant part of the textbook after each lecture.

Homework

There will be two types of weekly assignments:

- **Crowdmark Assignment:** For each week a set of written problems will be posted online in Crowdmark, and you should upload your solutions there. The problem sets posted each week is due on the **Tuesday** of the following week at **11:59 pm**. If you submit your problem set with up to 24 hours delay, your submission will be graded for half the credit. The first series will be posted in the second week of the semester and it is due on **September 14**. Each problem set is graded about a week after it is due. After each grading is posted, please review it as soon as possible and let me know if you believe any of your submissions is not graded correctly. I'll put you in touch with the grader of the problem to discuss the grading.
- **Webwork Assignment:** Each week you are also required to work on Webwork problems. Webwork problems are due on **Thursdays** at **11:59 pm**. No late Webwork assignment is accepted. The first series will be posted in the first week of the semester and it is due on **September 9**.

Homework problems are an essential part of this class. For one thing, they constitute a good portion of your final grades. More importantly, spending enough time on homework problems helps you to have a better grasp on the materials of the class. You should start working on homework problems closer to the time that they are assigned, not when it is due. You can, and in fact are encouraged, to collaborate on solving homework problems. Your classmates provide you with one of the best learning resources. So take advantage of that as much as possible. That being said, you should make sure that you know how to solve each problem after discussing it with others and then write it in your own language. Writing math is another important skill that you develop by doing written homework problems.

Exams

There will be two Midterms and a Final Exam. The dates and times are listed below:

- **Midterm 1:** Monday October 4, 6:30-8:30 PM
- **Midterm 2:** Monday November 8, 6:30-8:30 PM
- **Final:** Thursday December 16, 8:30-10:30 PM

There will be no makeup exams. Make sure that you are available at the listed times for the exams. Success on the exams will require correct and efficient solutions to the more difficult homework problems. Calculators are not allowed in the exams. On the other hand, there will not be computationally heavy problems in the exams.

Grading

Your final grade will be based upon your homework grades, midterms and final exam. To compute your homework grade, I will drop the lowest Crowdmark and Webwork grades. The average of the remaining Crowdmark grades will be half of your homework grade and the average of the remaining Webwork grades will be the other half. Then I compute the maximum of the following weighted grades:

	Method 1	Method 2	Method 3
Homework	20%	20%	20%
Midterm 1	25%	20%	25%
Midterm 2	25%	25%	20%
Final	30%	40%	40%

and use the grading scale below to give your letter grade:

A+	A	A-	B+	B	B-	C+	C	C-	D	F
TBD	[90, 100]	[85, 90)	[80, 85)	[75, 80)	[70, 75)	[65, 70)	[60, 65)	[55, 60)	[50, 55)	[0, 50)

If you are taking the class with the pass/fail option, you must earn at least a C- to pass.

Course Tentative Schedule

Week	Dates	Sections	Assignments	Notes
1	8/30 – 9/3	1.1 – 1.3		
2	9/6 – 9/10	1.5 – 1.6	WW* 1	No class on 9/6 (Labor day)
3	9/13 – 9/17	1.7 – 1.9	WW 2 & CM* 1	
4	9/20 – 9/24	2.1 – 2.3	WW 3 & CM 2	
5	9/27 – 10/1	2.4, 2.8, 2.9	WW 4 & CM 3	
6	10/4 – 10/8	3.1 – 3.3	WW 5 & CM 4	Midterm 1
7	10/11 – 10/15	4.1 – 4.2	WW 6 & CM 5	No class on 10/11 (Fall Break)
8	10/18 – 10/22	4.3 – 4.5	WW 7 & CM 6	
9	10/25 – 10/29	4.6, 4.7, 5.1	WW 8 & CM 7	
10	11/1 – 11/5	5.2 – 5.4	WW 9 & CM 8	
11	11/8 – 11/12	5.5, 6.1, 6.2	WW 10 & CM 9	Midterm 2
12	11/15 – 11/19	6.3 – 6.5	WW 11 & CM 10	
13	11/22 – 11/26	6.7	CM 11	No class on 11/24, 11/26 (Thanksgiving Break)
14	11/22 – 11/26	7.1 – 7.2	WW 12 & CM 12	
15	11/29 – 12/3		WW 13 & CM 13	

WW= Webwork, CM=Crowdmark

Disability Services

If you require accommodations for a disability which affect your work during the exams or the class, please contact the [Office of Disability Resources \(DR\)](#) to discuss appropriate arrangements. This should be done as soon as possible and at least two weeks in advance of the time that the accommodation is required (e.g. the first midterm).

COVID-19 Health and Safety Protocols

Exceptions to course attendance policies, expectations, and requirements because of a COVID-19 diagnosis, symptoms consistent with COVID-19, or exposure to a person with a confirmed or suspected COVID-19 diagnosis that requires quarantine or isolation will be made in collaboration between the student and instructor. In these cases, please notify your instructor as soon as possible to discuss appropriate accommodations.

While on campus, it is imperative that students follow all public health guidelines established to reduce the risk of COVID-19 transmission within our community. The full set of University protocols can be found [here](#). This includes:

- **Completing a self-screening using the [WashU COVID-19 Screening](#) app every day before coming to campus or leaving your residence hall room.** If you do not receive a green check and pass the screening, you are not permitted to come to campus or leave your residence hall room. You must contact the COVID Call Center (314)362-5056 or the Habif Health and Wellness Center (314)935-6666 immediately. Note: In addition to the symptoms listed in the screening tool, everyone also should pay attention to symptoms that are new or different for you, including things like headache and congestion, particularly in combination with diarrhea. These can also be signs of COVID-19. **Call the COVID Call Center or Habif to report these symptoms.**
- **Complying with universal masking.** All individuals on campus must wear disposable masks or cloth face coverings while occupying indoor public settings, including: multi-person offices, hallways, stairwells, elevators, meeting rooms, classrooms and restrooms. Masks are encouraged but not required for outdoor activities, particularly at large events or in crowded settings. Students with disabilities for whom masked instructors or classmates create a communication barrier are encouraged to contact [Disability Resources \(DR\)](#) or talk to their instructor for assistance in determining reasonable adjustments. Adjustments may involve amplification devices, captioning, or clear masks but will not allow for the disregard of mask policies.
- **Maintaining physical distancing as needed.** While distancing requirements have been removed for vaccinated students, those who are not fully vaccinated are strongly encouraged, for their own health, to maintain a distance of 6 ft from others in the classroom. If you are not able to be vaccinated or have conditions that may put you at increased risk of failed immunity and classroom activities would bring you in frequent proximity to other students, contact your instructor to discuss alternatives.
- **Practicing healthy personal hygiene,** including frequent handwashing with soap and warm water for at least 20 seconds and/or using hand sanitizer with at least 60% alcohol.

Resources for Students

The Learning Center: The Learning Center works collaboratively with University partners to provide undergraduate students key resources, like academic peer mentoring, to enhance their academic progress. See [here](#) to find out what support they may offer for your classes.

Reporting Sexual Assault or Harassment: If a student discusses or discloses an instance of sexual assault, sex discrimination, sexual harassment, dating violence, domestic violence or stalking, or if a faculty member otherwise observes or becomes aware of such an allegation, the faculty member will

keep the information as private as possible, but as a faculty member of Washington University, they are required to immediately report it to the Department Chair or Dean or directly to Ms. Cynthia Copeland, the Associate Title IX Coordinator, at (314)935-3411, cmcope1and@wust1.edu. Additionally, you can report incidents or complaints to the Office of Student Conduct and Community Standards or by contacting WUPD at (314) 935-5555 or your local law enforcement agency. See [here](#).

Confidential Resources for Instances of Sexual Assault, Sex Discrimination, Sexual Harassment, Dating Violence, Domestic Violence, or Stalking: The University is committed to offering reasonable academic accommodations (e.g. a no-contact order, course changes) to students who are victims of relationship or sexual violence, regardless of whether they seek criminal or disciplinary action. If a student needs to explore options for medical care, protections, or reporting, or would like to receive individual counseling services, there are free, confidential support resources and professional counseling services available through the Relationship and Sexual Violence Prevention (RSVP) Center. If you need to request such accommodations, please contact RSVP to schedule an appointment with a confidential and licensed counselor. Although information shared with counselors is confidential, requests for accommodations will be coordinated with the appropriate University administrators and faculty. The RSVP Center is located in Seigle Hall, Suite 435, and can be reached at rsvpcenter@wust1.edu or (314)935-3445. For after-hours emergency response services, call (314)935-6666 or (314)935-5555 and ask to speak with an RSVP Counselor on call. See [RSVP Center](#).

Bias Report and Support System (BRSS): The University has a process through which students, faculty, staff, and community members who have experienced or witnessed incidents of bias, prejudice, or discrimination against a student can report their experiences to the University's Bias Report and Support System (BRSS) team. To report an instance of bias, visit [here](#).

Mental Health Services: Mental Health Services' professional staff members work with students to resolve personal and interpersonal difficulties, many of which can affect a student's academic experience. These include conflicts with or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety, depression, and thoughts of suicide. See [here](#). Additionally, see the mental health services offered through the RSVP Center listed above.

WashU Cares: WashU Cares, specializes in connecting students to mental health, medical, financial and academic resources by using supportive case management. We seek to empower students to be successful through life's challenges and to have ownership of their experiences. Our services are designed to support Danforth Campus students. If you feel concerned about a students who may need help connecting to resources, we accept referrals from all students, faculty, and staff. If you are concerned about a student, you can file a report [here](#) and a WashU Cares Case Manager will reach out to you to get more information about your concern.

Other Resources and Useful Links

- [The Writing Center](#)
- [Engineering Communications Center](#)
- [Gephardt Institute](#)
- [Preferred Names and Gender Inclusive Pronouns](#)