

MAT 242: Elementary Linear Algebra

Course Description: Introduces matrices, systems of linear equations, determinants, vector spaces, linear transformations, and eigenvalues. Emphasizes the development of computational skills.

Credits: 2

Prerequisites: MAT 210, MAT 251, MAT 265, or MAT 270 with C or better

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Course Learning Outcomes

At the completion of this course, students will be able to:

1. Solve systems of linear equations.
2. Determine how many solutions a system of linear equations has.
3. Describe solutions to systems of linear equations using parameterization.
4. Evaluate expressions involving matrix addition, scalar multiplication, and matrix multiplication.
5. Solve equations involving matrix addition, scalar multiplication, and matrix multiplication, when the matrices contain variables.
6. Calculate the inverse of a matrix.
7. Calculate the determinant of a matrix, using expansion by minors.
8. Determine whether a vector is in the span of a set of vectors.
9. Determine whether a set of vectors is linearly independent.
10. Find a basis for, and the dimension of, a subspace, given a set of vectors that spans the subspace.
11. Given a linearly dependent set of vectors, find a nontrivial linear combination of those vectors that adds up to 0.
12. Find a basis for the row space, column space, and null space of a matrix.
13. Find the rank and nullity of a matrix.
14. Find the coordinates of a vector, with respect to an ordered basis.
15. Find eigenvalues and eigenvectors of a matrix.
16. Determine whether a matrix is diagonalizable.
17. Find the orthogonal complement of a subspace.
18. Find an orthogonal basis for a subspace, given a basis for that subspace.
19. Find an orthonormal basis for a subspace, given an orthogonal basis for that subspace.
20. Find the least squares solution to a system of linear equations.
21. Given a vector not in a subspace, find the vector in the subspace closest to that vector.
22. Find a line or a parabola that best fits a set of data points.

Textbooks: Linear Algebra without Theory, C. C. Heckman

Course Access: Your ASU courses can be accessed by both my.asu.edu and asu.instructure.com; bookmark both in the event that one site is down.

Graphing Calculators: For the Midterm, you are **NOT** allowed to use a calculator, just scratch paper. For the Final Exam, you will be allowed to use a graphing calculator that does not itself do algebra. Acceptable calculators include TI-83s, 84s, 85s, and 86s, but not 89s or 92s. [I will use this guide to determine whether a graphing calculator is acceptable or not.](#)

Computer Requirements

This is a fully online course; therefore, it requires a computer with internet access and the following technologies:

- Web browsers ([Chrome](#) , [Mozilla Firefox](#) , or [Safari](#))
- [Adobe Acrobat Reader](#) (free)
- Webcam, microphone, headset/earbuds, and speaker
- Microsoft Office ([Microsoft 365 is free](#) for all currently-enrolled ASU students)
- Reliable broadband internet connection (DSL or cable) to stream videos.

Note: A smartphone, iPad, Chromebook, etc. will not be sufficient for completing your work in ASU Online courses. While you will be able to access course content with mobile devices, you must use a computer for all assignments, quizzes, and virtual labs.

Help

For technical support, use the Help icon in the black global navigation menu in your Canvas course or call the ASU Help Desk at + 1- (855) 278-5080. Representatives are available to assist you 24 hours a day, 7 days a week.

Student Success

To be successful:

- check the course daily
- read announcements
- read and respond to the course email messages as needed
- complete assignments by the due dates specified
- communicate regularly with your instructor and peers
- create a study and/or assignment schedule to stay on track
- access [ASU Online Student Resources](#)

Third-Party website Statement

Any (parts of) exams, assignments, reports, or solutions to these, from current or previous semesters, posted to any website not affiliated with ASU will result in academic integrity disciplinary actions against the students posting them and the students using them.

Difference between tutoring and cheating

Be aware of the difference between tutoring and academic dishonesty. If you're receiving help to help yourself - to write your own, substantially original solutions - it is tutoring. If you're copying other people's solutions in part or in full, whether a tutor or someone else that is not you wrote them, it's cheating.

Academic Integrity

Academic honesty is expected of all students in all examinations, papers, laboratory work, academic transactions and records. The possible sanctions include, but are not limited to, appropriate grade penalties, course failure (indicated on the transcript as a grade of E), course failure due to academic dishonesty (indicated on the transcript as a grade of XE), loss of registration privileges, disqualification and dismissal. For more information, see <http://provost.asu.edu/academicintegrity>.

Asking for a higher grade than the one you have earned because you need a higher grade to maintain a scholarship, or to satisfy your own or someone else's expectations is a form of academic dishonesty.

WeBWork

is an online homework system that gives instant feedback to students' answers; it is located here. If you have not used WeBWork before, there is a practice problem set called the **Introduction to WeBWork**. The points you get will not count towards your grade.

We encourage you to solve these problems first on paper. Clicking on **Download PDF or TeX Hardcopy for Current Set** will create a PDF file of all the problems in the set, which can be downloaded to your computer or printed.

Homework will be a very important part of your learning. You cannot expect to solve all assigned problems easily. Some problems will require more time and effort. Even if you are unable to solve the entire problem, any time spent trying is not wasted. Try to emphasize understanding rather than memorization when you are working on the problems. Although it is an online course you still need to be able to explain all of the steps on your homework solutions. Expect to spend at least 5-10 hours weekly on homework and study time.

If you need help with the homework, don't email the teacher. Ask on Discussions. Below, you will find guidelines on how to ask questions on Discussions.

There is no automated synchronization of WeBWork grades with the Canvas grade center. The Canvas grade center will not show you your current WeBWork grade. The teacher will manually

export WeBWork grades and import them into Canvas to compute final grades after the final exam day.

Grading: The grades for this course will consist of two proctored tests, two assessments, and computer-graded homework. The online homework system that will be used for grading will be [WeBWork](#).

Midterm (Test 1). Final (Test 2)	75%
Assessments	15%
Webwork	10%

Your grade will be determined based on the following grading schema:

Grade	Percentage
A+	97 - 100%
A	93 – 96.99%
A-	90 – 92.99%
B+	87 – 89.99%
B	83 – 86.99%
B-	80 – 82.99%
C+	77 – 79.99%
C	70 – 76.99%
D	60 – 69.99%
E	0 – 59.99%

Failing grades (E, EN, and EU grades):

The E grade is for students who participated in the class the full semester but did not earn enough credit to pass or attain the D grade.

The EN grade is for students who never once participated in the class. At the instructor's discretion, any student who has not attended class during the first week of classes *may* be administratively dropped from the course. However, students should be aware that non-attendance would NOT automatically result in being dropped from the course. Thus, a student should not assume they are no longer registered for a course simply because they did not attend class during the first week. It is the student's responsibility to be aware of their registration status.

The EU grade is for students who participated, but then stopped after a certain point and never resumed.

Course Withdrawal:

A student who has not already received an EN grade may withdraw from a course with a grade of **W** during the withdrawal period. The instructor's signature is not required. It is a student's responsibility to verify that they have in fact withdrawn from a class.

The Grade of Incomplete:

A grade of incomplete will be awarded only in the event that a documented emergency or illness prevents the student who is doing acceptable work from completing a **small** percentage of the course requirements. The guidelines in the current general ASU catalog regarding a grade of incomplete will be strictly followed.

Instructor-Initiated Drop:

The instructor reserves the right to have students who meet certain conditions administratively dropped from the class. The following conditions qualify you for administrative removal from the class:

- **Any student who fails to take the Syllabus Quiz by 11:59 pm on Sunday, July 3rd, will be dropped from the course.**

However, students should be aware that non-attendance will NOT automatically result in being dropped from the course. Thus, a student should not assume they are no longer registered for a course simply because they did not attend class during the first week. It is the student's responsibility to be aware of their registration status.

Assessments

There are two assessments and they should be viewed as self-tests. It is best if you try to do it without the use of your notes (although this is not required). Solve the problems, then submit your solutions (answer and your work) as a PDF file to Canvas.

Most students will take pictures of their pages, upload them to a computer, include them in a word processing document, and export the result as a PDF. If you do this, make sure that after you've taken the picture, the sheet of paper fills the entire screen.

The assessments are not proctored through Honorlock.

Submitting Assignments

All assignments, unless otherwise announced, **MUST** be submitted to the designated area of Canvas. Do **NOT** submit an assignment via email.

Assignment due dates follow Arizona Standard time. Click the following link to access the [Time Converter](#) to ensure you account for the difference in Time Zones. Note: Arizona does not observe daylight savings time.

Late or Missed Assignments

Notify the instructor **BEFORE** an assignment is due if an urgent situation arises and you are unable to submit the assignment on time.

Follow the appropriate University policies to request an [accommodation for religious practices](#) or to accommodate a missed assignment [due to University-sanctioned activities](#).

Testing

The following procedures have to be observed:

1. When you are ready for your exam, be sure you are using a Google Chrome browser and the [Honorlock](#) extension. (If you use a different browser, the program will prompt you to download the Google Chrome browser first.) You must use a standard computer. Chromebooks are also allowed, but you won't be able to complete your exams on a tablet, iPad, other hybrid devices, or a phone.

For more information about Honorlock computer requirements visit <https://honorlock.com/support/>.

For more information about Honorlock, visit their knowledge base page <https://honorlock.kb.help/>; for answers to frequently asked questions (FAQ), visit <https://honorlock.com/studentprivacy/#faq>.

Complete Test 0 Honorlock Demo on Webwork to familiarize yourself with the testing procedure.

Other requirements include:

- A webcam

- A microphone
- Your ASU Sun Card or any government-issued identification. **Important note:** Please do not use a bank card or MidFirst ID with any financial information for ID verification. Also, don't use a federal military ID either.

2. Do not log out or click on the Back button while taking the test.

3. While taking the test, do not open other browser windows or tabs.

4. If you ignore these rules or simply fail to take the test during the testing window without a documented medical or personal emergency, the instructor is under no obligation to give you a second chance, and if you are given a second chance, there may be a grade penalty, and/or you may be given a more difficult test.

5. Bathroom breaks during proctored tests are NOT permitted. Please plan ahead and go to the bathroom before you start your test.

6. Cell phones and any internet-capable devices are not allowed during an exam, except for the computer you are taking the test on. Accessing any such device for any reason will result in a score of 0 for that exam and possible further disciplinary action.

7. You are not allowed to use notes of any kind on the exams, nor can you take pictures of your exams, save them, etc. **OTHER THAN THE REQUIRED WEBCAM, YOU CANNOT USE ANY CAMERAS ON THE TESTS.** You can't use a camera or software device to take screenshots of your test, or record your test by other means, such as using the browser's function to save the page. Attempting to record your test is considered cheating and grounds for academic dishonesty proceedings.

8. If your webcam is not easily movable, please have a mirror ready to show your test-taking room to the camera.

9. You cannot wear headphones/earbuds/headsets while taking exams. Please don't wear hats or hoodies that make it impossible to see that you are not wearing earbuds and such.

10. You are expected to be alone in the testing room and not talk to anyone else or yourself while taking the test.

11. You have a chance to re-grade your test after the first "grade" if you obtained less than 100%. That is, after you ask the system to "grade test", you will see a report on your work signaling the problems you got wrong if any. In case you got something wrong - try to make it right and "grade test" again. This is your last chance to fix errors - the score at this point will be your final score on the test.

12. If you get disconnected from the internet during test-taking, log back into the test using the same procedure you used to log in in the first place.

13. Place your laptop or webcam at a certain distance from you while you are taking tests so that the camera shows not just your face, but your hands and work area.

14. When you are done with your exams, please hold your scratch paper up to the camera, sufficiently close so the contents are legible.

Communicating With the Instructor

ASU email is an [official means of communication](#) among students, faculty, and staff. Students are expected to read and act upon email in a timely fashion. Students bear the responsibility for missed messages and should check their ASU-assigned email regularly.

All instructor correspondence will be sent to your ASU email account.

Course Discussion

- **All questions related to classwork or class logistics should be posted to the course discussion board. Homework, classwork, and class logistics questions emailed directly to the instructor will not be answered and the student will be directed to the discussion board. Only private issues should be directly emailed to the instructors.**
- When you post your questions on the discussion board, always include identifying information for the problem in the subject line, such as Webwork HW 5.5 problem 7.
- Post your question in the corresponding topic folder.
- Please search for the number of the problem you seek help on to see if there is already an existing discussion. Do not start new discussions if one already exists on the same problem. Please read the existing discussion first.
- Please include work. You may also photograph your written work and insert the image **inline**. On Webwork problems, include a screenshot of your version of the problem. Trim the image so it shows only the problem. **All pictures must be inline. Do not attach pictures as files.**
- Do not use the discussion board to air grievances such as "I have no idea how to solve this problem. Can you help me?" Try to identify what you don't understand and include your best wrong solution.
- Do not use the discussion board for personal messages. Those should be sent by email to the instructor directly.
- Stay on topic. Do not use the discussion board for discussions not related to this class.
- Do not use the discussion board to link to or promote third-party forum sites not affiliated with ASU.
- Please do not expect immediate replies. Instructors usually check daily. In the meantime, other students are encouraged to add feedback and commentary. Instructors may also deliberately stay in the background so as to promote student-led discussions.

Official ASU Online Proctoring Statement:

Students in face-to-face or online courses taking exams and quizzes at Arizona State University should expect to be proctored. The process includes verifying the identity of the student and

providing either live proctors or other forms of proctoring during the exam or quiz. In the case of face-to-face courses, students can be required to show a valid identification card, and expect to be monitored by proctors while taking either an exam or quiz. Proctoring of online students requires presenting a valid picture identification card as part of the verification process and monitoring by online proctoring software. ASU contracts with three online proctoring software companies. Each company has been carefully reviewed for software security and the protection of student data and must meet the standards of the ASU Internet Security Office. In addition, any company employee, including proctors, who would have access to student data must have a background check and be fingerprinted. Students can take exams in any location that has a reliable Internet connection. It is best to select a quiet location where the student can be alone in a room.

ASU Online Course Policies

View the [ASU Online Course Policies](#)

Accessibility Statements

View the [ASU Online Student Accessibility](#) page to review accessibility statements for common tools and resources used in ASU Online courses.

If any other tools are used in this course, links to the accessibility statements will be listed below this sentence.

Syllabus Disclaimer

The syllabus is a statement of intent and serves as an implicit agreement between the instructor and the student. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. Remember to check your ASU email and the course site often.

Departmental and University Policies and Procedures

For semester deadlines related to enrollment, withdrawal, or payments, see the academic calendar available at <http://students.asu.edu/academic-calendar>

Disability Resources

Students who feel they will need disability accommodations in this class but have not registered with the Disability Resource Center (DRC) should contact DRC immediately. The DRC Tempe office is located on the first floor of the Matthews Center Building. DRC staff can also be reached at: (480) 965-1234 (V) or (480) 965-9000 (TTY). For additional information, visit www.asu.edu/studentaffairs/ed/drc.

ASU Policy Against Threatening Behavior

Per [SSM 104-02](#), all incidents and allegations of violent or threatening conduct by an ASU student (whether on or off campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students. If either office determines that the behavior poses or has posed a serious threat to personal safety or to the welfare of the campus, the student will not be permitted to return to campus or reside in any ASU residence hall until an appropriate threat assessment has been completed and, if necessary, conditions for return are imposed. ASU PD, the Office of the Dean of Students, and other appropriate offices will coordinate the assessment in light of the relevant circumstances.

Title IX

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at <https://sexualviolenceprevention.asu.edu/faqs>.

As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, <https://eoss.asu.edu/counseling> is available if you wish to discuss any concerns confidentially and privately. ASU online students may access 360 Life Services, <https://goto.asuonline.asu.edu/success/online-resources.html>.

Student Conduct Statement

Students are required to adhere to the behavior standards of the Arizona Board of Regents Policy Manual [Code of Conduct](#), Academic Affairs Manual ACD 125 [Computer, Internet, and Electronic Communications](#), and the ASU Student [Academic Integrity Policy](#). Students are entitled to receive instruction free from interference by other members of the class. If a student is disruptive, an instructor may ask the student to stop the disruptive behavior and warn the student that such disruptive behavior can result in withdrawal from the course. An instructor may withdraw a student from a course when the student's behavior disrupts the educational process according to procedures of the Student Services Manual [SSM 201-10](#).

Academic Ethics

It's highly unethical to bring to your instructor's attention the possible impact of your grade on your future plans, including graduation, scholarships, jobs, etc. For the university's complete policy regarding ethics, including cheating, plagiarism and other forms of academic dishonesty, see the Student Academic Integrity Policy at the following web address: <http://provost.asu.edu/academicintegrity>