Lamar University

Department of Mathematics

Syllabus, MATH 3328-03, Linear Algebra I
Fall 2017, August 28 – December 12
MW 1:50-3:10, Galloway GB113, 3 credits

Instructor:	Dr. Mohsen Maesumi
Office:	L206 Lucas
Contact:	409-880-8766, maesumi@lamar.edu, maesumi@gmail.com
Office Hours:	Online + TR 10:00-10:45, 2:15-3:00, MW 3:15-4:15, knock on door Other times available by appointment.
Recommended Texts:	Linear Algebra, A Modern Introduction, 4th edition, by David Poole
Prerequisites:	C or better in Calculus I Math 2413 or its equivalent.
Required Access Code	WebAssign homework access code is required Register with class key: lamar 3334 7740
Website	http://www.math.lamar.edu/faculty/maesumi/syllabi.html
Recommended Prerequisites:	Calculus I, II, III, Physics I
Short To-Do list:	Sign on WebAssign, (sign roll) Correct preferred Banner email address (if you get a note from me about it.) Read, print, sign and return Class Regulation Sheet, (sign roll) Give a hard copy + Email resume, (sign roll) Have a binder with 100+ sheets and five small Blue Book examination books, A ruler and several highlighters or multi-colored pens will help.

Class Regulations:

During the last few years my courses have been redesigned to have an "open access" policy. For example, you have access to your notebook on tests. Also, internet-based instruction is used extensively to help students excel in their courses. As a result the grades have gone up from their historical average of 55 to well over 75. However a small group of students have taken unfair advantage of the course openness and engaged in various violations of academic honesty standards. For the grading system to be fair to all students it is essential that certain minimal and common-sense standards to be observed by all students.

To enforce these standards I will employ a "penalty schedule" for various infractions. Students are to read the class information here and online, and then sign a statement, at the latest by the census day, stating that they have read, understood, and agreed with class rules and the penalty schedule. As these will be strictly enforced you should take this seriously and if there are issues send an email and come to see me.

Please note that the first rule states: "Saying 'I did not know' will double the penalty."

Catalog Description: A first course in linear algebra, vector and matrix arithmetic, solution of linear systems, LU factorization, Eigen-analysis, elementary vector spaces, linear transformations, application to differential equations and Markov processes, singular value decomposition.
Prepares for: MATH 3301, 3321, 4315, 4318, 4330. Offered: Fall, Spring, Summer.

Learning Outcomes: Upon successful completion of this course, students will be able to:
1. Solve systems of linear equations using multiple methods, including Gaussian elimination and matrix inversion;
2. Carry out matrix operations, including inverses and determinants;
3. Demonstrate understanding of the concepts of vector space and subspace;
4. Demonstrate understanding of linear independence, span, and basis;
5. Determine eigenvalues and eigenvectors and solve problems involving eigenvalues;
6. Apply principles of matrix algebra to linear transformations;
7. Demonstrate application of inner products and associated norms;
8. Find the LU decomposition of a matrix and use this decomposition to solve a linear system;
9. Find the column space, row space, or null space of a matrix;
10. Determine the coordinates of a vector with respect to an ordered basis and to find a change of basis matrix from one basis to another;
11. Use the least squares method to find the closest solution to an inconsistent system;
12. Use the Gram-Schmidt process to find an orthogonal or orthonormal basis for a vector space.

Topics to be Covered:

1. Geometry and Algebra of Vectors	1.1
2. Length and angle, dot product	1.2
3. Lines and Planes	1.3
4. Applications, force vectors	1.4
5. Triviality	2.0
6. Introduction to linear systems	2.1
7. Direct methods for solving systems	2.2
8. Spanning sets and linear independence	2.3
9. Applications	2.4
9.1 Allocation of resources	
9.2 Balancing chemical equations	
9.3 Network analysis	
9.4 Electrical networks	
10. Matrices in action	3.0
11. Matrix operations	3.1
12. Matrix algebra	3.2
13. The inverse of a matrix	3.3
14. The LU factorization	3.4
15. Subspaces, basis, dimension, rank	3.5
16. Introduction to eigenvalues and vectors	4.1
17. Determinants	4.2
18. Eigenanalysis for n*n matrices	4.3
19. Similarity and diagonalization	4.4
20. Systems of differential equations	4.6
21. Gram Schmidt process	5.3

Lectures/Discussions: We will have traditional lectures augmented by online resources as found in course website where links to video lectures of prior years for this course and prerequisite courses may be available. The course topics, sections, and homework list will be posted on WebAssign. Additional homework problems may be posted on course website.

Homework: This counts for 50% of your grade. It is to be done on the WebAssign software. There are buttons for "show me an example", "ask for extension", "ask your instructor". Short questions can be answered online, if it is lengthy I will ask you to come and see me in office. Student should consider a homework target deadline for themselves that is 24 hours earlier than the software deadline. Time extension will not be given for Internet/electrical/financial problems. There is an expiration date for each homework. There is a substantial penalty for late submission. Homework from beginning of semester will lose all of its point value by the end of semester.
Course evaluation, conducted during the last few days before final, will be the last "homework" and is required. Submitting the resume is the first homework.

Exams and Grading Policies:
There will be three sectional tests and a cumulative final each counting for 1/8 of the total grade for the course. You are to bring a "Blue Book" to each test. The other 50% comes from homework.
Approximate dates (subject to change): M Sept 18, W Oct 11, M Nov 6.
Cumulative Final TBA.
Grading scale: A>90>B>80>C>70>D>60>F.
In case you want your exam to be reviewed or re-graded you need to add a note to cover page of your Blue Book and follow up with me within one week from the day grades are given. Two weeks after the final exam your course grade data will be discarded, unless you make a written request in person during the semester.
All issues that may influence your grade should be documented in an email from you to me and acknowledged in an email from me to you. At the end of final test, and before final grades are given, send a summary email.
Border line cases: Or, When does 89 become an A?
Answer: Please make sure you attend the classes and have done the following early on:
Getting on WebAssign, Sending your resume, Doing the course evaluation.

Mathematical Writing Rules:
Students are to familiarize themselves with type-setting formulas on WebAssign. Some hints and a list of the typical errors are listed on the website for the course. Some of the basic points of hand-writing mathematics are posted on a separate sheet available on course site.

Test Code:
During tests do not look sideways, you are to look at your own papers and protect them from others.
Your face should be visible to the instructor.
No obstruction by sunglasses, hair, hand, caps, etc.
Bring Lamar ID to all tests.
Use of printed sheets, cell phones, advanced calculators, shared calculators or loose paper is not allowed.
Use of unauthorized websites and communication with others, is not acceptable during tests.
Do not give your WebAssign passwords to any other person for any reason.
Unauthorized logins to WebAssign may result in a grade of F for the course.

See the penalty schedule for cost of infractions.
University academic integrity rules do apply (see below).

Privacy Issues:
There may be a seating assignment.
Your activity on computer will be monitored by a program.
Your papers, calculators, phone etc. may be inspected by the instructor during tests.
You may be asked to change your seat during a test.
If you violate the Test Code or class decorum rules you may get a public reminder in class.

Calculator: You are allowed to have a basic scientific calculator on tests. These cost about $20 new and do not have the following capabilities: graphing, matrix, computer algebra, wireless, or text storage. If you do not have a proper calculator you will take your test without one. Advanced calculators (e.g. TI80), cell phone calculators or sharing is not allowed. See penalty schedule for cost of infractions.

Curving the Grades: The grading style already has a built-in curve by allocating 50% to homework and allowing students to use their notebooks. Asking for an additional "curve" will look very odd. However, Students usually want to know how to improve their grades. Here are the typical questions and answers, as well as related policies.

Q. How does doing homework improve my grade?
A. First they count as 50% of the grade. Second: Tests are open notebook and mostly based on problems you have already done.
You are allowed to have one binder of entirely handwritten notes on the tests. Your notebook may contain

(a) Complete statement of problems and their solutions, from WebAssign or the text.
(b) Lecture notes.
(c) Handwritten formula tables from trig/algebra/calculus.
(d) Table of content and an index.

Please use a binder as loose papers are not allowed. Having printed papers results in a penalty.
This is a major privilege, not a right; so please do not abuse it as it may be revoked.

Q. How does attendance improve my test grade?
A. Homework questions are similar to the problems in the text, and these are what we will practice in class. Exam questions are very similar to problems done in class so attendance becomes very important.

Q. How do I improve my exam scores?
A. Try practice tests (under time constraints) before exams. The more of these practice tests you do the higher your grade.

How to Succeed:
This class is designed to allow you to get a high passing grade if you consistently apply yourself from the beginning.
For your notebook to be effective it needs to be searchable (as in a well-designed website) with page numbers, index, complete statement of problems and solutions, definitions, methods, and summaries. (Without having done the homework the notebook will not be of much help. So, please do not abuse this privilege!)
Even though you do the homework on WebAssign you should consider writing each problem in your notebook in its entirety so that you can look it up during tests.

Redo each problem several times to build up speed. That is how to do well on tests.

Items Allowed on Tests:
You may have a single binder of entirely hand-written class notes.
You may have solutions for homework problems, provided that the entire problem is recorded.
You may have a table of content in your binder, with page numbers, and an index of key phrases.
You may have hand-written formula sheets in your binder.
You may have a table of trigonometric values and identities in your binder.
For anything else ask me before assuming.
You may have a basic scientific calculator (cost: about $20 new). Or use Windows calculator.
See penalty schedule for the cost of infractions.

Course Evaluations: This is the final homework, and an important and required component for the course. You will receive an email reminder through your LU account. Evaluation window is open only for a few days and closes before finals start. Once you get the reminder go to your "MyLamar/Course Evals" link to complete. To prove that you have done the evaluations and get the bonus points you need to print the "Acknowledgement Page" that comes up once you are done with evaluations. This page has a list of all of your current courses. Write your name and your course name/section on it. Give the sheet to me at the beginning of the final.
Make sure you are on a working printer before you start. The Acknowledgement Page is only available immediately after you are done with evaluations (it may disappear upon second login).
Problems: Assessment Office 880-1843.

Student Contact Info: Students are required to have an active email registered with University which shows up on the "class email list". A trial email will be sent and announced in class. If you do not receive it, it is your responsibility to contact the responsible university office to correct the issue.
A small percentage of students do have problems with their emails. It is typically due to not selecting a "preferred email" during registration. Other issues are misspelling your email, putting parent email, or using email from a cancelled service.
If you ignore this issue, there will be no compensating recourse later.
Please do not change your name or email mid semester.

Instructor Contact Info: Your emails to me must be signed by putting your full name (as on the class roll) and the course name. You may be contacted with some last minute course information by email. My only contact is through the following address: maesumi@gmail.com and maesumi@lamar.edu If you leave a phone message for me (8766) please duplicate it by an email. Please do not use other email addresses, links or clickable address to reach me. Do not use reply button if your email is on a new topic.

Absence: Class roll may be taken. Do not sign for others. Unexcused absence beyond 10% of classes may reduce your grade by 1 point per missed class. Make up for tests requires notification on the same day and submission of verifiable written proof of emergency within one day. An individual decision will be made in each case. The final exam cannot be postponed. See penalty schedule for the results of fake emergency excuse. The grade for an excused missed test may be constructed through adjusted average of other tests or by using the final exam score.

No: Tardiness, food of any type, drinks, gum, ice, chips, candy, noise, music, headsets, e-activity as in surfing, scrolling, texting, etc in class. Please turn off and put your phones and music devices away. Same rules apply when you come for office visits. See penalty schedule for the cost of infractions.

Teams and Half-time Breaks: We will experiment with a 25-5-25 timing where each 5 minute period will be a break for asking questions or just walking around. Students will be divided in teams of 4 for joint in-class work if possible. You are encouraged to bring a laptop with you to class, but only if it is used for lecture-related activities.

WebAssign Errors: These do occur but are very rare. Typically the student has made a typo and thinks it is an error in WebAssign. Please read the syntax hints sheet that is posted online. Usually it is the issue of lower case f vs upper case F, Greek (alpha) vs English (a), 1(one) vs l (ell), 0 vs o, bold font **F** vs ordinary font F, [ ] vs ( ), etc. Keep a record of typical errors to remind yourself.
If you think WebAssign is making a mistake let me know and I will contact the company.

Student Resume: Students are required to make a resume for themselves applicable to this course. Items to include: an ID photo, detail of math courses taken, major, employment, long-term career plan, responsibilities, and any specific issue I need to know about. Give me a hard copy and also email. If the grade for this course is especially important to you detail for me the steps you are taking from the beginning of the semester to ensure your success.

Extension Time on Tests: Students typically ask for extension time on tests. This requires unanimous approval of students who are present. During a test I may ask if you agree to extend the test by 0, 5, 10, 15 minutes. We will go by what is feasible and approved by all in attendance.
In case of an in-class vote, if you are not in class during the vote and do not contact me within 6 hours of class vote time then you accept the result of the vote cast by others.

Audit Students: These students should contact me before signing on WebAssign. Uninvited students, multiple registrations, dropped students will be removed from the class list.

Letters of Recommendations: Students who are applying to graduate schools or scholarships are encouraged to do a project in addition to course requirements in order to get a strong letter.

Corrections: While I have made a sincere effort to ensure that this syllabus is correct, changes may be required. I will announce any substantive changes during a regularly scheduled class or by email. If you have suggestions or concerns feel free to bring it to my attention.

Important University-Wide Information for Students

Lamar University expressly prohibits intimidation and harassment of students, faculty, staff, or applicants. See http://students.lamar.edu/academic-support/code-of-conduct.html

Drop Policy: Please make note of the three dates indicated in this drop policy. Any drop will be your responsibility; I will not drop a student from the course.
***September 13, 2017*:** (Census Date-Six Drop Rule does not apply) A student may drop or withdraw without consulting with the instructor. The Six Drop Rule does not apply to a drop before 5:00 PM.
***September 29, 2017*:** (Six Drop Rule applies) A student may drop or withdraw from the course without academic penalty and receive a Q, however, the Six Drop Rule applies. The student will consult with the instructor and the Records Office to initiate a drop.
***November 03, 2017*:** (Six Drop Rule applies) Last day to drop or withdraw with academic penalty; the student must be passing the course at the time of the requested drop in order to receive a Q. The drop form, including all required signatures, must arrive in the Records Office by no later than 4:00 PM. No

drop is allowed after this date except in extreme extenuating circumstances. Any "late drop" must be approved by the instructor, department chair, college dean, and provost.

Academic Integrity: Students are expected to maintain complete honesty and integrity in their academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. Students are specifically warned against all forms of cheating and plagiarism. The *Lamar University Student Handbook* clearly reads: "Any student found guilty of academic dishonesty in any phase of academic work will be subjected to disciplinary action. Punishable offenses include, but are not limited to, cheating on an examination or academic work which is to be submitted, plagiarism, collusion, and the abuse of source materials." One aspect of the *Handbook*'s definition of cheating includes "purchasing or otherwise acquiring and submitting as one's own work any research paper or other writing assignment prepared by an individual or firm." Plagiarism is defined as "the appropriation and the unacknowledged incorporation of another's work or ideas into one's own and submitted for credit." Faculty members in the College of arts and Sciences investigate all cases of suspected plagiarism. Any student who is found cheating in this course will receive a course grade of F. http://students.lamar.edu/student-handbook.html

Accommodations: Lamar University is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is located in the Communications building room 105. Office staff collaborate with students who have disabilities to provide and/or arrange reasonable accommodations. If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact the DRC at 409-880-8347 or drc@lamar.edu to arrange a confidential appointment with the Director of the DRC to explore possible options regarding equitable access and reasonable accommodations. If you are registered with DRC and have a current letter requesting reasonable accommodations, we encourage you to contact your instructor early in the semester to review how the accommodations will be applied in the course. http://www.lamar.edu/disability-resource-center/

If students are to take specially designed test then it is the responsibility of student to contact DRC and make arrangements, including the signing of a form for this purpose one week in advance of the test and bringing the form to the instructor.

Campus Closure: In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University's website's homepage for instructions about continuing courses remotely. http://lamar.edu

Emergency Procedures: Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at: http://www.lamar.edu/about-lu/administration/risk-management/index.html
Following are procedures for the first two:

Severe Weather Procedure:

- Follow the directions of the instructor or emergency personnel.
- Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.

- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building.
- Stay in the center of the room, away from exterior walls, windows, and doors.

Violence/Active Shooter Procedure:

- **CALL** 8311 from a campus phone (880-8311 from a cell phone). Note: Calling 9-1-1 from either a campus phone or cell phone will contact Beaumont City Police Dispatch rather than University Police.
- **AVOID-** If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
- **DENY-** Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.
- **DEFEND-** Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.

Grade of Incomplete:

A grade of "Incomplete" may be recorded in the case of a medical emergency documented prior to the final exam and if the student is passing at the time. Such a request must be in writing and include a plan for completion of the course. No "Incomplete" will be authorized after the final exam.

From: https://catalog.lamar.edu/general-academic-policies/index.html :

The grade of "I" may be given when any requirement of the course, including the final examination, is not completed. Arrangements to complete deficiencies in a course should be made with the instructor prior to the end of the semester or term. Incomplete work must be finished during the next long semester or the Records Office will change the "I" to the grade of "F." While the extension may be granted by the instructor with the approval of his/her Department Chair and Academic Dean, once the "I" is changed to an "F" it cannot be changed back to an "I." In this case, either a "change of grade" procedure must be initiated or the course must then be repeated if credit is desired. The instructor may record the grade of "F" for a student who is absent from the final examinations and is not passing the course.