Math 233: Linear Algebra I

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Course Web Page: http://www.geneseo.edu/math/heap
Textbook: *A First Course in Linear Algebra*, by Lyryx Learning based on the text by K. Kuttler.

Course Info: This is a typical first course in Linear Algebra. Topics include linear equations, matrices, linear transformations, determinants, eigenvalues, eigenvectors, and various applications. Topics are subject to change depending on the progress of the class, and we may skip various topics due to time constraints.

Reading the textbook is a good idea. You should read the sections of the textbook that correspond to the material covered during the lectures. It is in your best interest to stay ahead in your reading. If you read about a topic *before* we discuss it in class, it will enable you to answer my questions and ask your own focused questions during the lecture. Whether you choose to read a section before or after we cover it in class, the reading will help you better understand the material. Furthermore, definitions are extremely important in this course. Be prepared to memorize a lot of them. Besides demonstrating competence in learning definitions, theorems, and problem-solving techniques of elementary linear algebra, you will also be required to demonstrate the ability to do **simple proofs** on homework and exams.

The notions of linear algebra are fundamental in almost all higher mathematics. In calculus courses, the concept of a function is what one arrives at after studying graphs or simple mechanical motion in physics and stripping away the information that is not essential to doing calculations. Similarly, the ideas studied in linear algebra are what comes from stripping away the unnecessary information involved in solving simultaneous equations, studying systems of differential equations, higher order differential equations, multivariable calculus, as well as the physics of three (or four or higher) dimensional space and advanced econometrics models. Just as a function is a higher level of abstraction than the quantity the function represents, matrices, linear transformations, and vector spaces are more abstract than the functions, equations, or physical or economic situations that they represent.

Upon successful completion of this course, a student will be able to:

- Solve systems of linear equations,
- Analyze vectors in $\mathbf{R}^n$ geometrically and algebraically,
- Recognize the concepts of the terms span, linear independence, basis, and dimension, and apply these concepts to various vector spaces and subspaces,
- Use matrix algebra and the relate matrices to linear transformations,
- Compute and use determinants,
- Compute and use eigenvectors and eigenvalues,
- Determine and use orthogonality, and
- Use technological tools such as computer algebra systems or graphing calculators for visualization and calculation of linear algebra concepts.

Grading: There will be regular homework assignments, two midterm exams, and a final exam. Your overall grade will be determined as shown below. **Exams** will be given during class. Exams are closed book, closed notes, closed friends, and open brain. Cell phones and other electronic devices will NOT be permitted in exams. Whether or not calculators are allowed on an exam will be determined later. Unannounced **quizzes** may be given from time to time and will be based on material from homework

and previous lectures. **Class participation** will be based on your willingness to **ASK and ANSWER questions** in class.

Homework, Quizzes, Class Participation ------------------------ 16%
Exam 1: --- 28%
Exam 2: --- 28%
Final Exam: -- 28%
* See course website for exact exam dates.

	B+…87-89	C+…77-79	D…60-69
A…93-100	B…83-86	C…73-76	F…Below 60
A-…90-92	B-…80-82	C-…70-72	

In all written work, you must show your work neatly and legibly in order to receive credit. You should clearly show the process and reasoning you went through in order to solve the problem. The problems I work for you in class will provide good examples of how your homework and exam problems should be written up. All assessment will be based on your ability to communicate a correct solution and explain your reasoning. It is absolutely essential to write clearly and completely. It is your responsibility to write in a way that tells me that you understand the problem and its solution.

Homework: Most homework will be done through the internet-based homework system called WeBWorK. However, there may occasionally be problems you must write out and hand in to me. All assignments must be completed by the given due date. To receive credit, assignments must be completed on time. **WeBWorK extensions will NOT be given without a legitimate excuse.** Complete as much of the assignment as you can by the deadline to receive partial credit. If you have a legitimate conflict you must tell me ahead of time.

Each student is responsible for completing his or her own WeBWorK assignment and any written assignments. However, **you are strongly encouraged to discuss the homework and to work together on the problems with your classmates.** Please be careful that you are actively participating in the process: many students find that they can understand a problem while they are watching a classmate work through it and explain it, and then conclude that they understand the material well enough. This leads to an unpleasant surprise at test time, when students who "thought they understood" the material find they are unable to work the problems on their own. Please be careful that you are able to work all of the problems on your own before the exam time arrives, with no coaching from a friend. Please use whatever resources aid you in learning the material, including computer assistance, office hours, other students, professors, other math books, etc.

Moreover, while it is not required that you complete a handwritten version of WeBWorK assignments, it is strongly encouraged. Writing a problem out by hand, showing all calculation steps, and keeping them collected in a notebook will greatly assist you as you prepare for exams.

Extra Help: There are many ways for you to get some help in this class. I am willing to spend a few minutes in class answering questions about homework problems. However, if you have a lot of questions, I recommend taking advantage of my office hours. I'll say it again…USE MY OFFICE HOURS! My job is to help you -- come to office hours even if you have just a small question. Don't wait until you get too far behind. If my office hours are not convenient for you, make an appointment by sending an email or asking after class. Please come see me as soon as you feel lost -- it is important that I know how you are doing so I can adjust the level of the class if necessary. I <u>WANT</u> to help you, and I <u>WANT</u> everyone to do well. There is also help available in the Math Learning Center (South Hall 332).

Don't let yourself get too far behind! I would be happy to see you if you feel you need some assistance. Come and get your questions cleared up right away.

Please Note: Any student with a disability requiring accommodations is encouraged to contact me after class or during office hours. All discussions will remain confidential.