Mathematics 023 - Applied Matrix Algebra COURSE SYLLABUS - SSI-03

Lecture: MTWR 1:00pm-2:30pm
Location: Sproul 2340

Instructor: Erin Pearse
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Office Hours: MTWR 2:40pm-3:30pm or by appointment
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This syllabus and all other course materials are available on the web site. Exam dates, homework assignments, homework due dates, and all other course information is available on the web site. As we may not be progressing through the book in a completely linear fashion, I will also be posting information about where in the text you can read more about the topics discussed in lecture. If you have questions about this course, you can always contact me by email, but you should CHECK THE WEB SITE FIRST.

Text: Elementary Linear Algebra (4th edition)
Author: Larson & Edwards

Course Material: We will be covering Chapters 1-3 and some sections of Chapters 4-5. I will attempt to incorporate as many business and economics applications as time will allow, and this will involve some supplemental reading materials which I will supply at a later date.

VERY IMPORTANT:
Keep all exams, quizzes, and homework. This is a record of your achievement. If you ever need to contest a grade, you must be able to present the original work. It is always possible that some scores will be improperly recorded or calculated. If this occurs, it will be the student's responsibility to demonstrate what their score should be.
Students have one week from receipt of a graded assignment, to dispute grades.
Late assignments will not be accepted without police or medical documentation. This includes exams. If you will be unable to submit a homework assignment on time, you can always turn it in early. There will be no makeups for missed exams unless notification is given in advance of the test date.
Show your work. Though many exam and homework questions are only short-answer, you should generally show as much work as possible to ensure full credit for a problem.

Homework: Homework is due Monday morning before class begins, except for the last homework assignment, which will be collected on Thursday, July 24 before class begins. Any homework not in the collection box when the bell rings is late. After being graded, the homework will be returned via the bins in the hall, next to the Math department office on the second floor of the Surge building. After the 80 minute lecture, I will be available in my office from 2:40 until 3:30. During this time, I invite you to come to me with questions about the lecture, homework, text, grades, or the course material in general.

Although you are encouraged to work on the homework with other people in the class, simply duplicating others' homework is missing the entire point. Working the homework problems will prepare you for the exams; copying another's homework will likely guarantee poor achievement on the exams. *Mathematics is learned by doing, not by listening.* Simply listening to the instructor and taking notes will likely not help you even half as much as working homework problems.

The homework material will include further development of the topics and ideas discussed in lecture and is intended to emphasize the applicability of matrix algebra in the fields of Business and Economics.

Tips for the Homework

1. If you get stuck on one of the exercises, do an easier problem from the same section.
2. You will likely find the exercises easier if you complete the reading assignment *first.*
3. If you are looking for practice questions in preparation for an exam, make sure you know how to do all the homework questions.

Quizzes: The quizzes will be very short versions (20 minutes) of questions similar to what you will find on the exams. Their purpose is to give you an idea of what to expect on the exams. If you have done and understood the homework, you should find the exams an easy way to pick up points and boost your grade. You may drop your one lowest quiz score.

Quiz Schedule:

Quiz 1	Wednesday	June 25	1.1 – 1.2 : Linear systems
Quiz 2	Tuesday	July 1	2.1 – 2.4 : Matrices
Quiz 3	Tuesday	July 8	2.5 : Markov Processes
Quiz 4	Thursday	July 10	2.5 : Leontief Models
Quiz 5	Wednesday	July 16	3.1 – 3.4 : Determinants
Quiz 6	Friday	July 24	4.1 – 5.1 : Vectors

Exams: All exams will be held in Sproul 2340. Only calculators with *no* graphical capability or extended memory functions will be allowed. Any instruments capable of symbolic manipulation are strictly forbidden. If you are uncertain whether or not your calculator would be allowed on exam, please see me about it *in advance.* Anyone caught with an illegal calculator during an exam will receive 0% on the exam. *Bring a valid Driver's License or Student ID to the exams as identification will be verified when you turn in your test.* The material covered on the exams may include anything from the homework, lecture notes, and assigned reading. While word problems *will* appear on the exams, they will be emphasized more in the homework, as they tend to take much more time to work out.

Partial Credit. Partial credit will be given where indicated. Many questions on the exams will be short answer and thus do not allow for partial credit.

Extra Credit. There will be some extra credit/bonus questions on the exam. Successfully answering these questions will add to your total score, potentially enabling you to obtain over 100%. These questions are intended to be more challenging than the others, and should thus probably be left for last.

Exam Schedule:

Midterm 1	Wednesday	July 2	1:10pm-2:30pm
Midterm 2	Thursday	July 17	1:10pm-2:30pm
Final Exam	Friday	July 25	1:00pm-3:00pm

Note that the final starts at 1pm sharp, not at 1:10.

Grades: The grade breakdown is as follows:

Homework	10%
Quizzes	20%
Midterm 1	20%
Midterm 2	20%
Final Exam	30%

Your grade will be assessed as a flat score and against a standard curve, according to the following scales. You will be given the better of the two letter grades.

Flat score	
A+	97%
A	93%
A-	90%
B+	87%
B	83%
B-	80%
C+	77%
C	73%
C-	70%
D+	67%
D	63%
D-	60%
F	0%

Percentile rank	
A+	97%
A	93%
A-	90%
B+	84%
B	76%
B-	70%
C+	58%
C	42%
C-	30%
D+	24%
D	16%
D-	10%
F	0%

This means that in order to get a C+ in the class, for example, you need to either obtain 77% of the available points or do better than 58% of your classmates. This grading scheme is a bit complex, but allows for maximum fairness; it is possible that everyone gets an A, but it is not possible that more than 10% of the class gets an F.

You should be able to calculate/predict your grades at any point, based on the data provided here.

Cheating policy: Anyone caught cheating will be immediately reported to Campus Discipline for academic dishonesty.

During exams, I understand that it is natural for your eyes to wander while you are thinking about a problem. However, if your eyes wander over someone else's desk, I will make a note of your name and the other person's name. This is not an accusation, but I will check the two exams against each other later. If they bear signs of cheating, an accusation will be made at that point.

	Monday	Tuesday	Wednesday	Thursday	
Week 1	6/23/2002	6/24/2002	6/25/2002	6/26/2002	
	1.1 Systems of Linear Equations - linearity, consistency - back-substitution elementary operations - elementary operations, equivalence - parameters and free variables	1.2 Gauss and Jordan - introduction to matrices; row operations - row-echelon form - Gaussian elim, Gauss-Jordan elim - homogenous systems	2.1 Matrices - equality of matrices - sums and scalar products - matrix multiplication - vectors, linear combinations **Quiz 1 : 1.1-1.2**	2.2 & 2.3 Props of Matrix Ops - algebraic props of scalars vs. algebraic props of matrices - invertibility, finding inverses - using inverses to solve systems - zero properties	
Week 2	6/30/2002	7/1/2002	7/2/2002	7/3/2002	
	- using inverses to solve systems (continued) - the transpose 2.4 Elementary Matrices - representing row operations - invertibility properties	Midterm 1 Review **Quiz 2 : 2.1-2.4**	**Midterm 1**	2.5 Matrix Applications Markov Processes - stochastic/transition matrices - consumer preference models - stability - probability vectors: transition and initial state vectors	
Week 3	7/7/2002	7/8/2002	7/9/2002	7/10/2002	
	2.5 Matrix Applications Markov processes (cont.) - equilibrium, steady-state - regularity, limits - homogeneous method of solution	2.5 Matrix Applications - The Leontief closed model - exchange matrices - review of previous example **Quiz 3 : Markov processes**	2.5 Matrix Applications - The Leontief open model - consumption matrices and production - productivity	3.1 Determinants - definition and calculation - examples, basic methods **Quiz 4 : Leontief models**	
Week 4	7/14/2002	7/15/2002	7/16/2002	7/17/2002	
	3.1 Determinants - calculation by cofactor method - higher-dimensional determinants	3.2 Properties of determinants products, inverse, transpose 3.4 Applications adjoints, Cramer's, eigens	Midterm 2 Review **Quiz 5 : Determinants**	**Midterm 2**	
Week 5	7/21/2002	7/22/2002	7/23/2002	7/24/2002	**7/25**
	4.1 Vector Spaces Vectors, vector operations 4.2 Vector Spaces	4.3 Subspaces 4.4 Spanning sets, linear indep	4.5 Basis, dimension 5.1 Length and dot product	**Final Review** **Quiz 6 : Vectors and vector operations**	Final Exam 1-3 pm