Syllabus
Math 215 (Introduction to Linear Algebra)
University of Rhode Island, Spring 2014

Contact Information:

Instructor: Dr. Glenn Faubert	**Contact via SAKAI Messages**	**Office:** Lippitt Hall 202A
Email: *gfaubert@math.uri.edu* SAKAI messages greatly preferred.	**Office Hours:** See SAKAI	

Course Description/Learning Outcomes:

This is an undergraduate course in linear algebra for students of engineering, science, and mathematics. Linear algebra is the study of linear systems of equations, vector spaces, and linear transformations. Solving systems of linear equations is a basic tool of many mathematical procedures used for solving problems in science and engineering. In this class we will concentrate on the mathematical theory and methods of linear algebra. The student will become competent in solving linear equations, performing matrix algebra, calculating determinants, and finding eigenvalues and eigenvectors. On the theoretical side, the student will come to understand the important notions of a vector space and of linear transformations. The student will learn what a matrix is why it is a linear transformations relative to a particular basis of a vector space. The student will become familiar with the vector space R^n and acquainted with vector spaces of polynomials in P^n and of continuous functions in $C[a,b]$. The definite integral from calculus will be revisited as an inner product. The student will understand the concept of orthogonality and apply it by projecting vectors into subspaces and decomposing vectors into components. Finally the student will learn how to solve over-constrained systems using the method of least squares. The engineering and science student will have a solid base of understanding in elementary linear algebra as required for further undergraduate work in those fields and the mathematics student will be prepared for a more formal and rigorous linear algebra course. Prerequisite for this course is one semester of college calculus, however, the mathematical maturity obtained from two semesters of calculus would serve the student well. Two semesters of calculus are recommended.

Evaluation/Grade:

Description	**Points**
3 in-class 50 minute midterm tests	15% each, total 45%
1 final examination	total 25%
28 homework assignments	total 15%
2 Mathematica assignments	5% each, total 10%
? Unannounced quizzes	total 5%

A (93% - 100%)	A- (90% - 92%)	B+ (87% - 89%)	B (82% - 86%)	B- (79% - 81%)
C+ (76% - 78%)	C (71% - 75%)	C- (68% - 70%)	D+ (65% - 67%)	D (60% - 64%)
F (0% - 59%)	Compute Grade by rounding to the nearest whole percent.			

Textbook

-Required- The required text for the class is Linear Algebra and Its Applications, 4th edition by David C. Lay. Publisher: Addison-Wesley/Pearson Education Inc. **No special consideration will be given to students without texts by the second class.** This text is available in the University Book Store. You may also use the 3rd edition of this text, but then you are taking the responsibility to get the correct homework assignments. The problems numbers will not match across editions. If you will be buying your text online you should order early. This textbook is a mathematics text and it should be read accordingly. Read it slowly for comprehension and with a pencil and paper at hand. Read corresponding material shortly before or shortly after the lecture, or both. Some students make the mistake of going directly to the homework problems before reading the section to save time but the cost in comprehension is prohibitive. Read your textbook!

Lecture

This class meets three time per week for 50 minutes. You are expected to be there three time per week for 50 minutes. Lecture time is at a premium, so it must be used efficiently. Expect lecture material to be covered at a fast pace. You are expected to come prepared to class as detailed below. You should complete all homework assignments on time. Before each lecture you should spend a few minutes reviewing the notes for the previous lecture. Also, a few minutes at the start of each lecture will be allocated to prepared student questions. Students who for good reason must arrive late, leave early, or miss class, must inform their instructor via a SAKAI message before class begins. Students failing to give notice may have their homework passes (see below) revoked. All students are expected to be respectful of each other and the instructor at all times. Any disruptive students will be removed from the classroom and the roster.

Exams

Three exams will be given in class on the days noted below. They will fit into the class period and must be handed in promptly when called for. Students will be penalized for not handing in tests immediately when called for. The typical penalty is 5% plus 5% per each additional minute the exam is late. All electronics must turned off, removed from your desk and out of sight. Cell phone must be unseen and unheard. After ONE warning over the entire term, a student will be penalized 5% for each cellphone interruption during an exam. A student seen handling a cell phone during an exam will be penalized 50% without warning. If you must take a call during lecture, take it outside and out of hearing range. Students repeatedly disrupting the class with cellphones or otherwise will be removed from the room and the class roster. Exams are designed to accurately assess students' knowledge of the class material. Exam grades are NOT scaled. Exam problems will be very similar to homework problems. Calculator use will not be allowed on exams.

Homework

Homework assignments must be handed in at the beginning of the class, or submitted via the SAKAI Drop Box Tool by 12:00 noon on the date due. DO NOT SUBMIT ASSIGNMENTS VIA EMAIL ATTACHMENTS OR FAXES! I will not accept them. I suggest using a word processor (e.g. Microsoft Word, OpenOffice, or LibreOffice) for assignments you will submit via the Drop Box. Assignments handed in at the beginning of class may be typed or neatly handwritten. All work must be shown to get credit for a problem. Some of the problems have answers in the back of the text for you to check. A naked answer from the back of the book with no supporting work or explanation is worth zero. Students may discuss homework problems with each other or with tutors but are expected to write up the final version independently. Late homework will be accepted until the beginning of the following class meeting at a 50% penalty. Homework not on the instructor's desk or in the Drop Box by the start of the lecture will be considered late. Put your name and assignment number the on top of the first page. Number each problem. All students get three homework passes that they may use to avoid penalty for missing or late homework. Passes cannot be used too close together. One pass may be used for HW#1-10, one pass for HW#11-18, and one pass for HW#19-28. For each unused pass, a lowest homework grade will be dropped from your average. Typically, five problems will be graded from each assignment. Grades for homework may be scaled. You should expect to spend 3-6 hours per week doing the homework.

Sakai

Sakai is being used to teach this course. This means that, if you have not already, you must start becoming acquainted with Sakai. You can access Sakai at the following web address: https://sakai.uri.edu/portal/ To log on, use your e-campus id and your URI email password (generally not your ecampus password). When you log into Sakai you will see a tab for each class that will be using SAKAI. Click on the tab for MTH215. If you have many tabs, you might need to click on “more” to show all your tabs. See the SAKAI Help Desk to remove previous semester tabs. More SAKAI Tools will become available during the first couple of weeks of class. You are expected to learn how to use all the tools listed in the left column on the MTH215 home page as they appear. Click on them. You will not break anything. If you get lost, click on Home. By week one you should be able to access the Syllabus, read Announcements, and use Messages. All messages to your instructor must be made via SAKAI. Please do not use regular email. By week two you should also know how to access your Grades, use the Drop Box, and access Resources. Other Tools may later be required by your instructor or may be optional.

Mathematica

Mathematica is a very well-known and powerful software package for mathematics. A student license is typically about $140 for students, but is available free to URI students. Go to the math department website for details about how to obtain your copy. Two Mathematica assignments will be corrected and graded in this class. Spending an hour or two learning how to use Mathematica with matrices early in the term save many hours checking homework solutions. Get it right away!

Calculators

Students are allowed (and encouraged) to use calculators to facilitate learning in MTH215, however, calculators will not be allowed on exams. Students using calculators on homework must still show all work to support their answers and may not refer to their calculator as a justification for answers.

Academic Integrity

Cheating is defined in the University Manual section 8.27.10 as *the claiming of credit for work not done independently without giving credit for aid received, or any unauthorized communication during examinations*. Students are expected to be honest in all academic work. The resolution of any charge of cheating or plagiarism will follow the guidelines set forth in the University Manual 8.27.10-8.27.20, http://www.uri.edu/facsen/8.20-8.27.html. A student caught cheating will get an F for the assignment, or an F for the course and/or face University disciplinary hearings resulting in possible dismissal.

Disability

Any student with a documented disability is welcome to contact me early in the semester so that we may work out reasonable accommodations to support your success in this course. Students should also contact Disability Services for Students, Office of Student Life, 330 Memorial Union, Kingston, 874-2098.

Semester Schedule

Class	Date	Text	Lecture Topics		HW Due 12 noon on Date
#1	Jan 22		Classes Cancelled		
#2	24	1.1	Systems of Equations		Enjoy the snow
#3	27	1.2	Row Reduction	HW01	p10: #1,6,8,9,13,23,24,30,31,32
#4	29	1.3	Vector Equations	HW02	p22: #2,3,7,9,11,16,21,23,24,30
#5	31	1.4	Matrix Eq: A x = b	HW03	p32: #2,4,5,9,11,12,14,15,17,24
#6	Feb 3	1.5	Solution Sets	HW04	p40: #1,4,7,8,10,13,15,24,25,30
#7	5	1.7	Independence	HW05	p47: #1,5,9,11,17,20,22,24,33,34
#8	7	1.8	Linear Transformations	HW06	p60: #3,5,7,9,13,19,22,27
#9	10	1.9	Transformation Matrix	HW07	p68: #1,3,5,7,11,13,14,15,16,17,19,32
#10	12	2.1	Matrix Operations	HW08	p78: #2,4,6,8,10,17,22,23
#11	**14**	2.2	Matrix Inverse	HW09	p100: #1,3,5,9,15,17,21,27
#12	17	2.3	Invertible Matrix Theorem	HW10	p109: #1,3,5,6,9,29,31,33
#13	19	**Exam 1**	**Covers 1.1 – 2.2**		
#14	21	4.1	Vector Spaces	HW11	p115: #11,12,16,18,24,28,30,34
#15	24	4.1-4.2		MA1	Mathematica assignment #1
#16	26	4.2	Null and Column Spaces	HW12	p195: #2,4,5,6,9,10,11,12,17,18
#17	28	4.3	Bases	HW13	p205: #1,2,3,5,8,12,15,16,18,25
#18	Mar 3	4.3-4.4			
#19	5	4.4	Coordinate Systems	HW14	p213: #1,3,5,9,11,15,21,31
#20	7	4.5	Dimension	HW15	p222: #1,3,7,10,13,14,27,28
X	Spring	Break			
#21	17	4.6	Rank	HW16	p229: #1,2,3,4,11,12,13,14,20,21
#22	19	3.1	Introduction to Determinants	HW17	p236: #1,2,7,8,15,16,18,25,27
#23	21	3.2	Properties of Determinants		
#24	**24**	**Exam 2**	**Covers 2.3,3.1,4.1-4.6**		
#25	26	5.1	Eigenvectors, Eigenvalues	HW18	p167:#2,4,9,15 pg175:#1,2,4,22,24,31
#26	28	5.2	Characteristic Equation	HW19	p271: #1,2,3,4,5,6,7,8,11,12,21,24
#27	31	5.3	Diagonalization	HW20	p279: #1,2,7,8,9,10,15,16
#28	Apr 2	5.3-5.4			
#29	4	5.4	Linear Transformations	HW21	p286: #1,3,9,13,17,27
#30	7	5.5	Complex Eigenvalues	HW22	p293: #1,3,7,11,13
#31	9	6.1	Inner Products, Orthogonality	HW23	p300: #1,5,6,9,11,13
#32	11	6.2	Orthogonal Sets	HW24	p336: #1,4,6,8,11,12,14,16,19,29
#33	14	6.3	Orthogonal Projections	HW25	p344: #2,4,6,7,8,13,14,18,20,27
#34	16	6.4	Gram-Schmidt Process	HW26	p352: #2,3,4,7,11,13,15,17
#35	18	6.5	Least-Squares Problems	HW27	p358: #1,3,5,7,9
#36	**21**	**Exam 3**	**Covers 3.2, 5.1–5.5, 6.1-6.4**		
#37	23	6.5,6.7		MA2	Mathematica assignment #2
#38	25	6.7	Inner product space examples	HW28	p366: #3,4,11,13,25. p382: #3,7,21,23
#39	28	Review			

There will be a **Final Exam** given in class at the time determined by the University final exam schedule.