SPRING 2015 MATH 2210Q SECTION 9 APPLIED LINEAR ALGEBRA
INFORMATION AND SYLLABUS

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Office: MSB 233 **Office Hours:** TuTh 10:00am - 11:30am

Classroom: ATWR A001 **Class Time:** TuTh 2:00pm - 3:15pm

Course Description: Systems of equations, matrices, determinants, linear transformations on vector spaces, characteristic values and vectors, from a computational point of view. The course is an introduction to the techniques of linear algebra with elementary applications.

Course Prerequisites: MATH 1132(116), 1152(121 or 136), or 2142(244). Recommended Preparation: a grade of C- or better in MATH 1132(116). Not open for credit to students who have passed MATH 3210(215).

Required Textbook: Linear Algebra and its Applications, by David C. Lay, 4th edition

Final Exam: Tuesday, May 5 at 1:00pm in ATWR A001 (tentative)

Homework: Homework problems will be assigned daily. These daily homework problems will NOT be collected, however, if you wish to perform well in this class, you should strive to complete as many as you can. In addition to the daily assignment, every Monday, I will hand out a problem sheet. This sheet will contain problems similar to the homework as well as some more challenging problems. It will be collected the following Monday and will be graded for accuracy. The daily homework problems are listed at the end of this syllabus. Late homework will NOT be accepted except for unusual circumstances, and in that case, only if I have been notified beforehand and approve of a new due date. For all of the homework, you are strongly encouraged to work together. If you need help, please utilize my office hours as well as the services of the Q Center.

Exams: There will be two Midterm exams. They will be held in class on September 27 and November 1. No makeup exams will be offered. If you have a valid reason for missing the exam and notify me beforehand, I will use your final exam grade as your grade for your missed exam (effectively increasing the amount of your grade the final exam encompasses). I will provide you with some practice exam questions about a week before the exam. These problem sets should give you a good idea of the level of difficulty to expect on the exam.

Final Exam: Then final exam is tentatively scheduled at 1:00pm on Tuesday, May 5 in ATWR A001. No make up will be given for the final exam or provision made for those who miss it except within accordance to university policy concerning the missing of a final examination. A request to reschedule the final exam is generally only granted to someone who has a set of "bunched finals" or an approved extenuating circumstance. If the conflict is known in advance, notice must be given well in advance of the final exam. Illness on the day of the final exam must be verified by Student Health Services and all requests must come through the Office of Student Services & Advocacy (OSSA). Please see the OSSA website (http://www.ossa.uconn.edu/) for more information.

Q Center: There is available tutoring sometimes in the Q Center on the first floor of the Homer Babbage Library. It depends on whether the tutors on duty feel comfortable helping with our course material. See the Q Center website (http://qcenter.uconn.edu/index.php) for more information on when tutors are on duty for Linear Algebra help. Also, they have a list of private tutors you can hire if you need extra help.

Calculators: A calculator, computer algebra system (like Maple or Mathematica), or similar computer program (like Matlab) is required for some of the homework exercises (those indicated with an [M]). Any such system is allowed for use in this course, although, in general, any TI calculator from model 83 and up is sufficient. However, unless otherwise stated, the exams will be written so they can be done without the need of a calculator and as such, calculators will NOT be allowed on the exams.

Grades: Scores for assignments and exams will account for the following portions of your final grade.

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

However, to make grading more convenient, I have designed the course grading so that a point on a homework may not necessarily equal a point on a midterm exam or final.

Absences and Make-Up Work: It is solely your responsibility to be in class. I will not take roll. If you miss class due to illness or other reasons, it is your responsibility to obtain notes from a friend and/or find out from me or others what we covered in class. Generally, missed exams or quizzes cannot be made up, however, policies regarding missed work in any of these categories can be found in the appropriate section above.

Academic Integrity: Honesty and integrity are essential in a strong education; if you cheat or lie, you are disadvantaging yourself as well as others. As such, cheating of any kind will not be tolerated in this class. You have the freedom to use whatever resources available to you for homework assignments. However, for the quizzes, midterm exams, and the final exam should represent entirely your own work. You may not use any outside resources for these exam like assignments. Cell phones, ipods, mp3 players, ipads, etc. must be turned off and put away during quizzes or exams as should everything else except your calculator, pencil, eraser, and perhaps some blank scratch paper. Any programs on your calculators should be deleted beforehand. Any other questionable behavior should also be avoided, i.e. if you have a question about whether something you are doing or plan to do is cheating, either ask me about it or simply do not do it. Any deviation from these required behaviors will constitute a violation of the Student Code and will result in severe consequences. These consequences may include, but are not limited to, receiving a 0 for that particular exam, receiving an "F" for the entire course, and/or my sending of a letter to the Dean of Students. For more information, see the full version of the Student Code of Conduct at http://www.community.uconn.edu/student_code.html.

General Expectations: All of you are collegiate level students and so I expect collegiate level commitment to this class. This is an important class even if you think it is not essential to your future job or major. A solid math background is vital to any well rounded education and will benefit you in ways that you may not realize right now. As such, it is very important for you to take this course seriously and work hard. Complete all of the assignments, attend all of the classes, and get any and all extra help that you may need throughout the course. Don't just do it for the sake of a grade, but do it for the sake of your own education.

SPRING 2015 MATH 2210Q SYLLABUS

Day	Section(s)	Topic(s)	Homework
Jan 20 - 22	1.1 - 1.3	Systems of Equations Row Reduction and Echelon Forms Vector Equations	**1.1:** 1, 3, 6, 8, 10, 12, 14, 16, 18, 21, 23, 24, 25, 27, 30, 32, 33, 34 **1.2:** 1, 4, 5, 8, 11, 14, 15, 19, 21, 22, 24, 27, 29, 30, 31, 33 **1.3:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 19, 21, 23, 24, 26, 28, 29, 30, 31, 32, 33, 34
Jan 27 - 29	1.4 - 1.6	Matrix Equations Solution Sets of Linear Equations Applications of Linear Systems	**1.4:** 2, 4, 6, 8, 10, 12, 13, 15, 17, 18, 19, 21, 23, 24, 25, 26, 29, 31, 32, 35, 37, 39, 41 **1.5:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 23, 24, 25, 26, 28, 30, 33, 36, 39, 40 **1.6:** 1, 3, 5, 7, 9, 11, 13, 15
Feb 3 - 5	1.7 - 1.9	Linear Independence Linear Transformations and their Matrices	**1.7:** 2, 4, 6, 8, 10, 14, 16, 18, 20, 21, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 43 **1.8:** 1, 3, 5, 7, 9, 11, 13, 15, 17, 18, 19, 21, 22, 23, 24, 26, 28, 30, 32, 34, 36, 38, 40 **1.9:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 23, 24, 26, 28, 30, 32, 33, 34, 35, 36, 38, 40
Feb 10 - 12	2.1 - 2.3	Matrix Operations The Inverse of a Matrix Characterizations of Invertible Matrices	**2.1:** 2, 4, 6, 8, 10, 12, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 33, 34, 36, 37, 38, 39, 40, 41 **2.2:** 1, 3, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 30, 35, 37, 39 **2.3:** 2, 4, 6, 8, 10, 11, 12, 13, 14, 16, 18, 20, 22, 24, 26, 27, 30, 32, 34, 36, 38, 40, 41, 42
Feb 17	1.1 - 2.3	Catch Up and Review	Complete Midterm 1 Practice Problems
Feb 19		**Midterm Exam 1**	

Day	Section(s)	Topic(s)	Homework
Feb 24 - 26	2.4, 2.7, 3.1	Partitioned Matrices Applications to Computer Graphics Introduction to Determinants	**2.4:** 2, 4, 6, 8, 10, 11, 12, 14, 16, 18, 19, 20, 21, 22, 24, 25, 26, 27 **2.7:** 1, 2, 3, 6, 7, 9, 11, 12, 14, 16, 18, 20, 21, 22 **3.1:** 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 38, 39, 40, 42, 43, 44, 45, 46
Mar 3 - 5	3.2, 3.3, 4.1	Properties of Determinants Cramer's Rule and Volume Vector Spaces and Subspaces	**3.2:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46 **3.3:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 25, 26, 27, 30, 32, 34 **4.1:** 1, 2, 4, 6, 8, 10, 12, 13, 14, 16, 18, 19, 21, 23, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 37
Mar 10 - 12	4.2 - 4.4	Null Spaces and Column Spaces Linearly Independent Sets, Bases, and Coordinate Systems	**4.2:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 25, 26, 28, 29, 30, 31, 34, 35, 39, 40 **4.3:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 26, 28, 30, 31, 32, 34, 36, 37 **4.4:** 2, 4, 6, 8, 10, 12, 14, 15, 16, 18, 20, 21, 23, 24, 26, 28, 30, 32, 34, 36, 38
Mar 17 - 19		Spring Recess	
Mar 24 - 26	4.5 - 4.7	Dimension of a Vector Space Rank Change of Basis	**4.5:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 19, 20, 21, 23, 25, 26, 27, 28, 29, 30, 32, 33 **4.6:** 2, 4, 6, 8, 10, 12, 14, 16, 17, 18, 20, 22, 24, 26, 27, 28, 29, 30, 33, 34, 35, 37 **4.7:** , 4, 6, 8, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20
Mar 31	5.1 1.1 - 5.1	Eigenvectors and Eigenvalues Catch Up and Review	5.1: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 35, 38, 40 Complete Midterm 2 Practice Problems
Apr 2		**Midterm Exam 2**	
Apr 7 - 9	5.2 - 5.4	Characteristic Equation Diagonalization Eigenvectors and Linear Transformations	**5.2:** 2, 4, 6, 8, 10, 12, 14, 15, 17, 18, 19, 20, 21, 22, 24, 26, 27, 28, 30 **5.3:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 26, 27, 28, 29, 30, 31, 32, 34, 36 **5.4:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 23, 24, 25, 26, 28, 29, 31, 32
Apr 14 - 16	5.5, 5.7, 6.1	Complex Eigenvalues Applications to Differential Equations Inner Product, Length, and Orthogonality	**5.5:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 23, 24, 26, 27, 28 **5.7:** 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21 **6.1:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 19, 20, 22, 24, 26, 28, 30, 32, 34
Apr 21 - 23	6.2 - 6.4	Orthogonal Sets Orthogonal Projections The Gram-Schmidt Process	**6.2:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 23, 24, 25, 27, 29, 31, 34, 35, 36 **6.3:** 2, 4, 6, 8, 10, 12, 14, 16, 18, 19, 20, 21, 22, 24, 25, 26 **6.4:** 1, 2, 4, 6, 8, 10, 12, 14, 16, 17, 18, 19, 20, 22, 24, 25
Apr 28 - 30	6.7 - 6.8 Everything	Inner Product Spaces and Applications Catch up and Review	**6.7:** 2, 4, 6, 8, 9, 10, 14, 15, 16, 17, 18, 19, 22, 24, 25, 27 **6.8:** 2, 4, 6, 8, 10, 12, 14, 16 Complete Final Exam Practice Problems

Final Exam: Tuesday, May 5 at 1:00pm in ATWR A001 (tentative)