NUMERICAL METHODS AND LINEAR ALGEBRA
Math 2890 Syllabus Spring 2010

Space-Time: Snyder Memorial 2040, Monday and Wednesday 5:45 pm - 7:00 pm

Instructor: Mao-Pei Tsui

Office Hours: UH2080B M 12-2 pm, W 1-2, 4-5pm, F 1-2 pm

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Homepage: http://www.math.utoledo.edu/∼mtsui/

Class Web Site: http://www.math.utoledo.edu/∼mtsui/2890sp10/2890.html

Text: *David C. Lay, Linear Algebras and its Applications, third edition SBN-10: 0201709708*

Prerequisites: MATH 1830, 1850 or 1920

Homework: There will be two types of homework. Typically, homework will be assigned weekly and collected at the beginning of the class on the due date. Assignments and their due dates will be posted on this course website. Late assignments will not be accepted unless in extraordinary circumstances. Your solutions must be neat and show all work. If you do not show your work then you will not receive credit for your solution. The other type of homework is the online homework assignment. It can be accessed at http://brahmagupta.uhe.utoledo.edu:8080/webwork2/

I will drop your two lowest homework scores.

Quizzes: Throughout the semester, there will be several 15 minute quizzes given during class, the dates to be announced in advance. The material in the quizzes will be drawn from the homework and suggested problems selected for the previous week. The lowest quiz score will be dropped.

Exams: We will have two in-class midterm exams, and a two hour final exam.

- Midterm I Feb. 17 (Wednesday) 5:45 pm - 7:00
- Midterm II March 29 (Monday) 5:45 pm - 7:00
- Final Exam May 5 (Wednesday) 5 pm-7 pm

The final exam is comprehensive and will slightly place more emphasis on the material covered after the last in-class exam.

Attendance, Missed Quizzes and Exams: I will not give make-up quizzes unless you have the official document. It will not affect your final grade if you miss one quiz since your lowest scores will be dropped. However, if you are in the habit of missing classes regularly then probably you will fail. Making up missed quizzes will not help. There will be no exceptions to this rule. Absences for quizzes and exams can only be excused if covered by the University's missed class policy. The policy specifically mentions absences from class may be excused for personal emergencies, religious observances, participation in certain UT sponsored activities, and government required activities. For more information see http://www.utoledo.edu/index.asp?id=529. If you are sick the day of the exam then you must call or email that same day if you expect to be able to make up the exam. Otherwise you must arrange for a make-up quiz ahead of time. If I am not in my office then you can leave a voice mail message. If you fail to show up for an exam and do not contact me about it until afterwards then you will not be able to make up that exam you will get a 0. There is a new policy in effect at the University, and I am no longer able to issue an Instructors Withdrawal (IW). If you stop attending then I will report this to the Registrar, who will attempt to contact you about your status in the class. However if you wish to avoid a failing grade for the class then it is up to you to initiate a withdrawal.

Grading: The following percentages are assigned to the components of the student's grade.

Quizzes	15%
Hand in homework	10%
Webwork homework	5%
Exam I	20%
Exam II	20%
Final Exam	30%

In computing the quiz grade the lowest quiz score will be dropped.

Your final grade will be determined from the distribution of total points earned, on the following scale: 90-100% earns an A; 80-89% earns a B; 70-79% earns a C; 60-69% earns a D.

Resources: There are resources available for students who need extra help outside of my office hours. For this courses the most reliable source of tutorial help can be found at the Mathematics Learning and Resource Center located in the basement of Carlson Library(adjacent computer lab).

Goals:

At the end of the course, students should be able to

- make calculations with agility, accuracy, intelligence and flexibility
- explain the basic concepts clearly and reason logically with them.

Expectations :

To achieve these goals, students are expected to

- read each section of the textbook before the material is presented in class
- attend the lectures
- complete all homework assignments
- discuss mathematics with other students and the instructor

Calendar:

Martin Luther King Day	Monday, January 18
Last date to drop	Jan. 25
Exam I	Feb. 17 (Wednesday)
Spring Break	March 8 to March 12
Last date to withdraw	March 26 (Friday)
Exam II	March 29 (Monday)
Final exam	May 5 (Wednesday) 5 pm-7 pm

Course outline: This is a course in numerical methods in linear algebra. The focus of the course is on matrix factorizations and the algorithms used to find them. The use of the computer program Matlab or Maple is an integrated part of this course. This is brief outline of the sections covered from the textbook:

- Chapter 1, sections 1.1-1.5, 1.7, 1.8: linear systems, row reductions, vector equation, matrix equations, solution sets, linear independence, linear transformations
- Chapter 2, sections 2.1-2.5, 2.8, 2.9: matrix operation, matrix inverse, invertible matrices, partitioned matrices, matrix factorization, subspaces of R^n, dimension and rank;
- Chapter 5, sections 5.1-5.3, 5.8: eigenvectors, eigenvalues, characteristic equation, diagonalization, iterative methods;
- Chapter 6, sections 6.1-6.5: inner products, orthogonal sets, orthogonal projections, Gram-Schmidt orthogonalization process, the method of least squares;
- Chapter 7, sections 7.1-7.2, 7.4: diagonalization of symmetric matrices, quadratic forms, singular value decomposition