MA2071 - Matrices and Linear Algebra 1 – Sections C06A and C07A
Term C16 – January 14 - March 4

Instructor: Professor Peter R. Christopher   Office: SH 305B
            email: peterrc@wpi.edu   Telephone: 508-831-5269
        Office Hours: Monday - 3:00-3:50pm
                Tuesday – 2:00-2:50pm
                Thursday 11:00-11:50am, or by appointment.

Teaching Assistants (TAs): Section C06A, Xiao Shen (xshen@wpi.edu) Office hour: Tuesdays at 11 in SH 204.
Section C07A, Susan Elliott (sfelliott@wpi.edu) Office hour Fridays at 10 at the Hagglund Room, Campus Center

Class Schedule: MTRF – 1:00–1:50pm, AK 233

Conference Sessions: Section C06A: Wednesday, 1:00-1:50pm, SH 202
                Section C07A: Wednesday, 1:00-1:50pm, SL 105

Text: Lay & Lay & McDonald, Linear Algebra and its Applications, 5th edition, plus MyMathLab with Pearson eText -- Access Card Package
Available as hard text, loose leaf or as an online e-text, all with MyMathLab, which requires an access code. Purchase a domestic edition, not the Global edition. The online version is the least expensive option, and this can be purchased from the bookstore or when you register for MyMathLab at: http://www.pearsonmylabandmastering.com/northamerica/mymathlab/
You will need the Course ID which is christopher76146.

Course Goals:
1. Learn the language and methods of linear algebra.
2. Develop an appreciation of abstraction and mathematical rigor.
3. Appreciate the power of linear algebra to solve real-world problems.
4. Apply technological tools as an aid to computation.
5. Build a strong foundation in the subject, so that you have the ability to research and solve more advanced problems.

Students in this class should enjoy mathematical challenges and be interested in the "why" as well as the "how" of linear algebra. This course is a bridge to more advanced mathematics.

Grades and Requirements:
        Average scores in the 90s, 80s or 70s will guarantee grades of A, B, C, respectively. The following table gives the point value of each activity.

ACTIVITY	% POINTS
Test 1	27
Test 2	27
Test 3	27
Homework/Projects	14

	Quizzes			5
			Total	100

Homework:
One-half of your homework grade will be based on problems done online using My MathLab (MML). We have prepared a list of online exercises for you to gain proficiency in the material. Those exercises correspond to the list of suggested text problems that appear on this syllabus, with minor variations. You are not obligated to do the suggested text problems, but you may find it helpful to review them before attempting the corresponding online exercises. Each MML exercise is valued at one point, regardless of level of difficulty, with no partial credit. The exercises may be saved and printed. The deadline to complete a set of MML exercises is at noon, one hour before the test on that material. However, you are advised to complete the MML exercises as each topic is covered (or before if you wish).

Students are responsible for determining where we are in the syllabus and for keeping aware of possible changes in the syllabus or in the schedule. The other half of your homework grade is based on special weekly assignments that will be required to be passed in. These can be done individually or preferably in teams of 2 or 3 students. Each member of a team should contribute and understand all aspects of the assignment. Some of these special problems may be challenging, and some problems may require technological assistance for their solution. We will not dictate which tools you should use. You may want to try MATLAB or the linalg package in MAPLE.

Quizzes
> Your TA will administer 5-10 minute quizzes during conference. We may also have an occasional quiz in class.

Tests
> We have scheduled three tests to be taken in class. The emphasis is on concepts and processes more than calculation and quick answers.

Conferences
> Participation in conferences is expected. In these sessions you may be asked to participate in a cooperative learning environment. The TA is there to guide you in solving problems, rather than to solve problems for you.

Academic Honesty
> You are strongly encouraged to work together on assignments. However, you are required to work independently on quizzes and class tests, and possibly in other circumstances. You are expected to be familiar with the WPI Academic Honesty Policy. See http://www.wpi.edu/offices/policies/honesty/policy.html). If you should ever be unsure as to whether your intended actions in this course are academically honest or not, please contact Professor Christopher.

Special Needs
> If you have a disability or a medical condition that may require special consideration, please let me know. Students in this situation should also contact the Office of Disability Services (ODS) located at 124 Daniels Hall, 508-831-4908.

(See http://www.wpi.edu/offices/disabilities.html)

MA 2071 - MATRICES AND LINEAR ALGEBRA I
SYLLABUS

Chapter 1   Linear Equations in Linear Algebra

1.1   Systems of Linear Equations   p.10 6, 11, 13, 17, 25, 31, 34
1.2   Row Reduction and Echelon Forms p.21 2, 7, 11, 13, 19, 29, 31, 33
1.3   Vector Equations   p. 32 5, 7, 9, 11, 13, 17, 19, 25, 29
1.4   The Matrix Equation $Ax = b$ p. 40 1, 6, 7, 9, 19, 23, 26, 33
1.5   Solution Sets of Linear Systems p. 48 1, 5, 11, 15, 23, 25, 35
1.6   Applications of Linear Systems p. 55 3, 7, 13
1.7   Linear Independence   p.61 1, 5, 7, 9, 11, 15, 16, 17, 19, 21, 23, 27, 31, 33, 35, 36
1.8   Introduction to Linear Transformations p.69 1, 4, 7, 9, 11, 17, 19, 21, 31, 33
1.9   The Matrix of a Linear Transformations p.79 1, 3, 5, 13, 15, 17, 21, 23, 25
1.10   Linear Models in Business, Science, and Engineering p.87 9, 11, 12, 14

Test 1 – Thursday, January 28

Chapter 2   Matrix Algebra

2.1   Matrix Operations   p. 102 5, 7, 9, 15, 27, 29, 39
2.2   The Inverse of a Matrix   p.111 1, 6, 8, 9, 13, 17, 19, 29, 33, 35, 37
2.3   Characterizations of Invertible Matrices p.117 3, 7, 11, 13, 15, 17, 19, 23, 26, 34, 36, 37
2.4   Partitioned Matrices p.123 7, 15, 25
2.5   Matrix Factorizations p.131 1, 3, 11, 17, 25, 26
2.7   Applications to Computer Graphics p.146 3, 5, 8, 11, 19

Chapter 3   Determinants

3.1   Introduction to Determinants p.169 3, 7, 9, 11, 16, 17, 25, 26, 28, 37, 39, 41
3.2   Properties of Determinants p.177 1, 3, 9, 12, 15, 18, 21, 25, 27, 31, 35, 39

Test 2 – Friday, February 12

Chapter 4   Vector Spaces

4.1   Vector Spaces and Subspaces p.197 1, 7, 11, 13, 15, 17, 21, 24, 32, 35
4.2   Null Spaces, Column Spaces, and Linear Transformations p. 207 1, 3, 9, 15, 17, 23, 26, 28, 30, 32, 35, 39

Chapter 5   Eigenvalues and Eigenvectors

Chapter 6   Orthogonality and Least Squares.

Topics will be selected from this chapter, as time permits

Test 3 – Friday, March 4