MAT188H1F LINEAR ALGEBRA: Course Information as of August 26, 2014

This is a first course in linear algebra. Although this material is intrinsically simpler than calculus, it may *seem* more difficult, because it is more abstract than calculus. But once you get used to the new concepts you will find that the computations in this course are more routine than those in calculus.

Section Instructors: by now you should be scheduled into one of the following Sections:

LEC0101 Qian, L.	LEC0102 Schachter, B.	LEC0103 Loizides, Y.	LEC0104 Shen, X.
LEC0105 Lein, M.	LEC0106 Burbulla, D.	LEC0107 Pavlov, A.	LEC0108 Eskandari, P.

Textbook: *Elementary Linear Algebra with Applications* by Jeffrey Holt. **Warning:** this is only the second time we are using Holt's book. Its order of topics is totally different than the order of topics in books we were using previously. Keep this in mind when you look at old tests and exams prior to 2013. Moreover, Holt includes much more material on linear transformations than our previous books, but less material on vectors in three dimensions than our previous books. Anything you know from high school—such as the dot product, the cross product, equations of lines and planes in three dimensions—can be used in this course, if it helps you.

Homework: some exercises have been picked as suggested homework; see the back of this page. These are the ones that your TA should be prepared to help you with.

Tutorials: you should attend your tutorial on a regular basis; it is one place you can get help with your homework. However, it is totally impractical to assume that *all* the homework questions can be covered in tutorial; you should try and solve as many homework problems as you can, *on your own,* and then ask your TA about the questions you couldn't get. Tutorials start Monday, Sep 8*th* and end Monday, Dec 1*st*. There are no tutorials on Monday, Oct 13*th*. Each tutorial group will meet twelve times.

Marking Scheme: Diagnostic Tests: 5%; WeBWorK: 5%; Test 1: 20%; Test 2: 20%; Exam: 50%

Diagnostic Tests: to be written on Tuesday, Sep 9, times and locations TBA. The purpose of these tests is to see if any students have gaps in their high school math, and then offer help to these students before *real* tests start.

WeBWorK: information regarding this on-line homework website will be posted on the course website in the second week of classes. WeBWorK homework will not begin until September 22.

Test 1: a 100-min term test is scheduled for Tuesday, Sep 30, 12:15-1:55 PM, locations TBA.

Test 2: a 100-min term test is scheduled for Thursday, Nov 6, 6:15-7:55 PM, locations TBA.

Final Exam: there will be a common final exam, 150 min long, during the exam period, Dec 8-19.

Math Aid Office: GB 149. Hours: MW 12-1, 3-4; TR 12-3

Calculators: Use of a Casio FX-991MS or Sharp EL-520X calculator will be permitted during all quizzes, tests and exams. However, it is still your responsibility to explain your work. A correct answer with no justification will receive no marks.

Course Coordinator: D. Burbulla. Office: GB 149; email: burbulla@math.toronto.edu;

office hours: MW 12-1, 3-4; TR 12-3

Course Websites: In addition to the course websites which can be accessed through the U of T portal there is the coordinator's home page: `http://www.math.toronto.edu/burbulla/`

Classroom Deportment: the format of lectures is more formal than what you may be used to from high school. During lectures there should not be any disruptions that would prevent other students from hearing or seeing the instructor: no talking, no cell phones, no music, no eating or drinking. You should raise your hand to ask a question. You should arrive on time. If you do arrive late, please enter by a back door and sit down in the first available seat so as not to disrupt the rest of the class.

Course Outline, Lecture Schedule and Tutorial Schedule: below are approximate schedules of lecture and tutorial topics. As some lectures will be missed on Monday, Oct 13*th*, the schedule presumes only 38 lectures. Sections marked with an asterisk (*) are optional and may not be covered in class. They will not be tested. What each test covers will be announced during the term. **Note:** in addition to the Suggested Homework Exercises you should try *all* the True or False questions in each section!

Chapter	Section	Suggested Homework Exercises
Systems of Linear Equations (5 lectures)	Sec 1.1	5, 13, 19, 27, 33, 35, 39, 45, 49, 63
	Sec 1.2	7, 9, 13, 21, 25, 30, 41, 53, 55, 57
	Sec 1.4	1, 3, 9, 11, 17, 19, 21, 25
Euclidean Space (5 lectures)	Sec 2.1	6, 9, 13, 17, 25, 29, 49, 57, 61, 79
	Sec 2.2	9, 11, 15, 19, 27, 33, 41, 49, 65, 71
	Sec 2.3	5, 11, 17, 27, 31, 37, 53, 54, 57, 69
Matrices (6 lectures)	Sec 3.1	7, 11, 25, 27, 31, 37, 51, 52, 61, 63
	Sec 3.2	3, 9, 13, 19, 21, 29, 37, 53, 55, 61
	Sec 3.3	7, 12, 19, 23, 26, 27, 39, 54, 61, 63
	Sec 3.4*	None
	Sec 3.5*	None
Subspaces (5 lectures)	Sec 4.1	5, 6, 15, 16, 25, 31, 39, 42, 65, 69
	Sec 4.2	9, 10, 15, 16, 27, 31, 37. 38, 64, 73
	Sec 4.3	3, 7, 11, 15, 19, 21, 25, 39, 57, 58
Determinants (5 lectures)	Sec 5.1	3, 9, 15, 31, 33, 37, 39, 53, 57, 77
	Sec 5.2	3, 13, 17, 21, 25, 37, 39, 59, 63, 65
	Sec 5.3	5, 11, 19, 21, 23, 27, 57, 58, 59, 67
Eigenvalues and Eigenvectors (7 lectures)	Sec 6.1	3, 17, 27, 29, 47, 49, 52, 57, 61, 63
	Sec 6.3	9, 11, 15, 19, 21, 28, 29, 45, 46, 47
	Sec 6.4	3, 7, 13, 17, 25, 27, 40, 43, 44, 45
	Sec 6.5*	None
	Sec 6.6	3, 13, 17, 21, 23, 25, 27, 29, 31, 37
Orthogonality (5 lectures)	Sec 8.1	9, 14, 19, 23, 25, 31, 32, 68, 69, 71
	Sec 8.2	9, 11, 14, 17, 19, 22, 25, 27, 30, 50
	Sec 8.3	9, 10, 17, 21, 23, 27, 59, 62, 63, 66
	Sec 8.4*	None
	Sec 8.5*	None

Tutorial	Material/Exercises
Sep 8 - Sep 12	Proof by Induction Sec 1.1 & 1.2
Sep 15 - Sep 19	Sec 1.2 & 1.4 Sec 2.1
Sep 22 - Sep 26	Sec 2.1, 2.2 & 2.3
Sep 29 - Oct 3	Sec 2.3 Sec 3.1 & 3.2
Oct 6 - Oct 10	Sec 3.2 & Sec 3.3
Oct 14 - Oct 20	Sec 3.3 Sec 4.1
Oct 21 - Oct 27	Sec 4.1, 4.2 & 4.3
Oct 28 - Nov 3	Sec 4.3 Sec 5.1 & 5.2
Nov 4 - Nov 10	Sec 5.2 & 5.3 Sec 6.1
Nov 11 - Nov 17	Complex Numbers Sec 6.1 & 6.3
Nov 18 - Nov 24	Sec 6.3, 6.4 & 6.6
Nov 25 - Dec 1	Sec 8.1, 8.2 & 8.3

We will not cover numerical methods, Sections 1.3 and 6.2. Some tutorial time will be spent on complex numbers, reference Section 6.5, because they no longer seem to be covered in high school. Your lecturer may or may not include complex eigenvalues in Sections 6.6. Either way, quizzes, tests and exams in MAT188H1F will *not* require complex numbers. In Section 8.3 we'll skip QR Factorization. We will not cover any of Chapters 7, 9, 10 or 11.