Math 511: Linear Algebra
MWF 9:30-10:30 in Recitation 315

Instructor: T. T. Moh   Office: 638 Mathematics Building   Phone: 49–41930

E-mail: ttm@math.purdue.edu

Web: http://www.math.purdue.edu/~ttm

Office Hours: $\begin{cases} \textbf{MWF } 10{:}30{-}11{:}20 \\ \text{or by appointment} \end{cases}$

General Information

Course title " Linear Algebra with Applications". Linear algebra is second only to calculus/differential equations in terms of mathematics of importance to engineering applications. The goal of this course is to enable you to recognize linear algebra problems when you see them and to use the linear algebra you know to solve them. Other goals are to enable you to read and understand descriptions of other people's solutions to problems that use linear algebra and to read the documentation for the linear algebra features of the mathematical software you need to use.

This is a course describing applicable mathematics. While we will occasionally mention some specific applications. Most of you already know or will soon learn the application material and need to better understand the tools.

Throughout, the course remains conscious of the reliance on computers for real world computation. Moreover, there is a formal computer component to the course: some homework is inconvenient to do without a machine of some kind and the project will require it. The Mathematics Department makes MATLAB, an industry standard program for numerical linear algebra, available in some Macintosh and Windows labs administered by PUCC for use in this course and many engineering departments have linear algebra software available on their machines. Assistance is available for students S–Th, 7:00pm-10:00pm, at the Macintosh Lab in LAEB B275 for Spring Semester 2015. The Student Version of MATLAB is recommended; student versions for Macintosh and Windows are available for about $50 at the bookstore. In addition, many of you have calculators that do linear algebra calculations.

The stated prerequisite, Math 262, is accurate in spirit in that students who know absolutely nothing about linear algebra are likely to have a hard time, but is not literally accurate because most students did not do their undergraduate work at Purdue and much of the linear algebra learning that I expect you to know will have come informally from a variety of engineering sources. The course will be complete, but basic material on computational topics such as row operations will be covered quickly.

References

TEXT: Strang's book *Linear Algebra and Its Applications,4th edition* which has been used in the past, is a good reference and is in the library. The problems in Strang tend to be less difficult both computationally and theoretically than the text's, but Strang develops the subject very well and presents excellent intuition for the subject and its applications.

Grading Policies

There will be two one–hour tests, each counting 20% of your grade, and 30% of your grade will come from the two–hour final exam given during the 16th week (May 5–May 10). Both one–hour tests will be an in–class test. "You may bring one letter size cheat sheet (double sided) to the exams."

Weekly homework (collected Friday) will make up 30% of your grade. The lowest 2 of your homework scores will be dropped. Because of this policy, late homeworks will be accepted only

in the case of extended absence. You should show your all your work on homework and tests. Results of machine computations will be acceptable in **all** homework problems in place of hand computation; "show your work" in this case means writing down the computation you asked the machine to do and giving the result of this computation. (You should **NOT** attach a printout of your computer session unless explicitly asked to do so!)

Academic Adjustments

Students who have been certified by the Office of the Dean of Students – Adaptive Programs as eligible for *academic adjustments* should go to MATH 242 and request the information sheet for *this* semester that explains how to proceed this semester to get these adjustments made in Mathematics courses. (It is not the same as last semester.) *This should be done during the first week of classes.* Only students who have been certified by the ODOS – Adaptive Programs and who have requested ODOS to send their certification letter to their instructor are eligible for academic adjustments. Students who are currently undergoing an evaluation process to determine whether they are eligible for academic adjustments are encouraged to find out *now* what procedures they will have to follow when they are certified by requesting the above mentioned Information Sheet from MATH 242. Large print copies of the Information Sheet are available from MATH 242 upon request.

Math 511 Linear Algebra with Applications, Spring 2015

Text: Linear Algebra and its Applications by Gilbert Strang (4th Edition)
US Edition ISBN 0-03-010567-6 International Edition ISBN 0-534-42200-4

Date	Session	Section	Homework US Edition	Homework Intnl Edition
1/12	1	1.2,1.3	p.9:3;p.16:10,20	p.9:5;p.16:12,22
1/14	2	1.4	p.26:5,12,13,20	p.26:6,9,15,21
1/16	3	1.5	p.40:5,15	p.40:7,19
1/21	4	1.6	p.52:6,11	p.52:10,17
1/23	5	Review	p.27:10,17;p.39:1 p.53:12,13;p.65:12,19	p.27:11,13;p.39:2 p.53:19,16;p.65:12,17
1/26	6	2.1	p.74:3,7	p.74:5,4
1/28	7	2.2	p.85:7,13	p.85:1,15
1/30	8	2.3	p.98:1,8,9,16	p.98:4,10,8,13
2/2	9	2.3	p.101:28,29,34	p.101:36,31,35
2/4	10	2.4	p.110:3,20,37	p.110:2,27,32
2/6	11	2.5	p.122:1,2,3 (Kirchoff's Laws)	p.122:2,1,9 (Kirchoff's Laws)
2/9	12	2.6	p.133:3,4,5,9,25	p.133:6,8,12,1,17
2/11	13	Review	p.74:9,20;p.98:1,32 p.133:18,22,;p.137:5	p.74:10,19;p.98:4,37 p.133:14,20;p.137:4
2/13	14	Exam 1	Lessons covered: 1-12	
2/16	15	3.1	p.148:6,8,9,14	p.148:3,18,14,12
2/18	16	3.2	p.158:3,5,14,16	p.158:11,10,16,15
2/20	17	3.3	p.170:4,11,12,13	p.170:2,17,15,9
2/23	18	3.4	·p.186:6,11,13 (Euclidean space)	p.186:10,7,9 (Euclidean space)
2/25	19	3.4	p.187:20,21,24,25 (Function spaces)	p.187:22,17,21,18 (Function spaces)
2/27	20	3.5	p.196:1,5,6	p.196:10,13,11
3/2	21	3.5	p.196:8,9,11	p.196:16,5,4
3/4	22	Appendix A	p.420:1,2,4,8	p.420:4,5,2,6
3/6	23	4.1,4.2	p.206:1,4,10,11	p.206:2,4,8,10
3/9	24	4.3	p.215:3,7,15	p.215:1,11,20
3/11	25	4.4	p.226:2,12,13	p.226:5,11,14
3/13	26	Review	p.148:5;p.170:6,24;p.230:1,2 p.187:9,15;p.198:6,8,30	p.148:1;p.170:6,23;p.230:12,9 p.187:13,16;p.198:12,1,32
3/23	27	Exam 2	Lessons covered: 15-25	
3/25	28	5.1	p.240:4,5,6,9,10	p.240:5,7,4,10,11
3/27	29	5.2	p.250:3,5,14	p.250:6,8,10
3/30	30	5.4	p.275:1,2,5,6	p.275:1,2,10,9
4/1	31	5.4	p.276:8,9,14	p.276:7,6,12
4/3	32	5.5	p.288:1,2,6,17,18,20	p.288:1,6,10,15,12,20
4/6	33	5.6	p.302:1,2,13,17	p.302:4,3,16,18
4/8	34	Appendix B	p.427:1,3	p.427:4,1
4/10	35	Review	p.242:13,24;p.251:7,11,12 p.276:15;p.291:12,19;p.303:22	p.242:12,27;p.251:4,12,14 p.276:20;p.291:18,16;p.303:20
4/13	36	6.1	p.316:2,4,7	p.316:8,9,3
4/15	37	6.2	p.326:1,5,8,15	p.326:2,3,13,15
4/17	38	6.5	p.350:1,3	p.350:7,2
4/20	39	Review	p.241:11;p.250:1,10;p.276:7 p.317:3,10;p.326:2	p.241:12;p.250:3,9;p.276:8 p.317:2,11;p.326:1
4/22	40	7.1,7.2	p.357:1,5	p.357:5,9
4/24	41	7.3	p.365:1,4	p.365:1,11
4/27	42	6.3	p.338:15 (find SVD only)	p.338:14 (find SVD only)
4/29	43	Review		
5/1	44	Review		