UNIVERSITY of GUELPH

SCHOOL OF ENGINEERING

ENGG*1500: ENGINEERING ANALYSIS
COURSE OUTLINE - WINTER 2009

COURSE DESCRIPTION

Engineering application of matrix algebra, vector spaces and computer techniques to solve linear systems. Linear transformations. Eigenvalues and eigenvectors. Diagonalization. Complex eigenvalues and eigenvectors.

INSTRUCTOR

Dr. Dalia. Fayek
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THRN 1340, x52013

TEACHING ASSISTANTS

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CO-REQUISITES

ENGG*1210 Engineering Mechanics I
MATH*1210 Calculus II

COURSE SCHEDULE

LECTURES:		Tuesday	10:00AM – 11:20AM	MCLN 102
		Thursday	10:00AM – 11:20AM	MCLN 102
TUTORIALS:	01	Monday	9:30AM – 10:20 AM	MACK 307 (*)
	02	Tuesday	1:30PM – 2:20PM	MACK 307 (*)
	03	Wednesday	9:30AM – 10:20 AM	MACK 307 (*)
	04	Thursday	1:30PM – 2:20PM	MACK 307 (*)
Final exam		Mon, April 13, 2009	8:30 – 10:30AM	TBA

(*) Please refer to “Method of Presentation” Section.

TEXT

Linear Algebra and Its Applications, 3rd Edition, David C. Lay

COURSE OBJECTIVES

Students who successfully complete this course will be able to:

- describe selected engineering systems in terms of vector and matrix models
- carry out the fundamental operations of vector, matrix and complex variable arithmetic
- solve simultaneous equations, representing engineering systems, by matrix methods
- use computer techniques to solve some engineering problems

COMMUNICATION

Principal method of communication between instructor, teaching assistants and students is through the email-list **engg1500@listserv.uoguelph.ca**. It's the student's responsibility to ensure that he/she is on the mailing list.
"Courselink" is the course web site. Course material will be posted there.
Office hours will be offered by the instructor and teaching assistants. Schedule of office hours will be emailed to engg1500 list and/or posted on Courselink.

MATERIAL TO BE COVERED

Engineering Analysis is a core course for all students in Engineering. It covers the uses of vector and matrix techniques used to solve engineering problems. Emphasis is placed on engineering applications and current computer techniques using MATLAB.

Linear systems and their applications	2 – 2.5 weeks
Matrix operations, determinants and square matrix inverse	1 – 1.5 week
Vector spaces and Orthogonality	2 – 2.5 weeks
Eigenvalues and Eigenvectors	1.5 – 2 week
Complex Eigenvalues and Linear transformations	1 - 1.5 week
Diagonalization and Quadratic forms	1.5 week

Possible additional topics to be covered:

Least Squares	0.5 week
Constrained Linear Optimization	0.5 week
Singular Value Decomposition	0.5 week

METHOD OF EVALUATION

The final grading will be determined according to the following scheme:

Quizzes	30%
Programming Assignments	20%
Final Exam	50%

METHOD OF PRESENTATION

- The material listed above will be presented in 2 lectures per week.
- On alternating weeks, regular one-hour tutorial periods will include problem sets compatible with the lecture material to enhance understanding of the subject matter. These tutorials will be in MACK 307.
- MATLAB training sessions will be conducted during tutorial times in THRN 2313 as outlined in the course calendar (page 4).
- Four in-class quizzes will be written according to the schedule indicated on the course calendar. The best three out of the four quizzes will have the 30% weight in the course evaluation.
- Two programming assignments using MATLAB are required to complete the course requirements. Groups of 2 or 3 students will submit one report electronically. Details of submission will be given for each assignment. Reports for groups having more than 3 students will not be accepted.

QUIZ SCHEDULE

Quiz (1)	Quiz (2)	Quiz (3)	Quiz (4)
Thu --- January 22	Tue --- February 10	Thu --- March 5	Tue --- March 24

ASSIGNMENT SCHEDULE

Programming Assignment (1)	Programming Assignment (2)
Friday, February 6, 2009 at noon	Friday, March 27, 2009 at noon

NOTES

- Programmable functions are not to be used for the quizzes nor final examination.
- Late programming assignments will be penalized 20% of the assignment total mark for every 12-hour delay. The mark of assignments submitted after 24 hours of the due date/time is zero.
- Requests for academic consideration must be made known to the instructor in writing no later than Jan 16th, 2009.
- The quiz mark will be based on the best 3 quizzes out of 4. There will be no make-up for any missed quiz. There will be no academic consideration for missed quizzes. If a student writes less than three quizzes, the missing quiz(zes) will have a grade of zero. For example, if a student writes Quiz (1) [15 out 20] and Quiz (2) [15 out of 20]. Then the total grade is 30 out of 60, that is 15% out of the 30% quiz weight in the total course evaluation.
- Any act of academic misconduct will be reported. Please refer to the University of Guelph policies on Academic Misconduct: Section VIII - Undergraduate Degree Regulations and Procedures.

January 2009

Sun	Mon	Tue	Wed	Thu	Fri	Sat
Week #				1	2	3
1	5	6	7	8	9	10
2	12	13	14 MACK 307	15	16	17
3	19	20	21 THRN 2313	22 Quiz (1)	23	24
4	26	27	28 MACK 307	29	30	31

February 2009

Sun	Mon	Tue	Wed	Thu	Fri	Sat
5	2	3	4 THRN 2313	5	6 Programming Assignment (1) due at noon	7
6	9	10 Quiz (2)	11 MACK 307	12	13	14
7	16	17	18 Winter Break	19	20	21
	23	24	25 MACK 307	26	27	28

March 2009

Sun	Mon	Tue	Wed	Thu	Fri	Sat
8	2	3	4 THRN 2313	5 Quiz (3)	6	7
9	9	10	11 MACK 307	12	13	14
10	16	17	18 THRN 2313	19	20	21
11	23	24 Quiz (4)	25 MACK 307	26	27 Programming Assignment (2) due at noon	28
	30	31	1	2	3	4

April 2009

Sun	Mon	Tue	Wed	Thu	Fri	Sat
12	30	31	1 MACK 307	2	3 Classes end	4
	6	7	8	9	10	11
	13 Final Exam 8:30-10:30 AM Location:TBD	14	15	16	17	18
	20	21	22	23	24	25
	27	28	29	30		