MATH 210: Applied Mathematics for Engineers
(Spring 2014)

Frequency: Spring Term

Credit: (4-0)4

Catalog Description: Vector differential and integral calculus. Matrices. Determinants. Systems of linear equations. Characteristic values and characteristic vectors of matrices. Introduction to numerical methods.

Prerequisite: MAT 120 or consent of the Department.

Course Objectives: This course is designed to give second year engineering students fundamental concepts of vector calculus and linear algebra relevant to their fields, solutions of linear algebraic systems of equations, eigenvalues, roots of nonlinear equations, interpolation, and numerical differentiation and integration.

Course Coordinator: Kürşat Aker

Exams and Grading: Course grades are determined by homework, one (non-cumulative) midterm exam, and a (cumulative) final exam, as well as a small number of bonus points awarded on the basis of attendance.

- **Midterm :** 40 %
- **Final:** 45 %
- **Homework:** 15 % [3x WeBWorK = 6% ; and 3x Written = 9%]
- **Bonus:** 5 % (Timed Challenge Problems)

Homework: Written and Online homework will be assigned and graded during the semester. For online homework the WeBWorK system is used.

Textbooks: "Computational Science and Engineering." Strang, G., 1st ed. *(ask your professor about this)*

Website: http://math.ncc.metu.edu.tr/math210/

Make-up Policy: In order to be eligible to enter a make-up examination for a missed examination, a student should have a documented or verifiable, and officially acceptable excuse. A student cannot get make-up examinations for two missed exams. The make-up examination for all exams will be after the final exam, and will include all topics.

Math Help Room: The mathematics help room in T-103 is a room staffed by mathematics faculty and teaching assistants where students may gather to ask questions, work on homework, and view exams. *Students are also invited to seek out instructors in their offices.*

S1 K. Aker	Mon 13:40-15:30 Thu 8:40-10:30	TZ-19
S2 K. Aker	Mon 10:40-12:30 Wed 10:40-12:30	TZ-22
S3 B. Walter	Tue 10:40-12:30 Fri 8:40-10:30	TZ-22

INSTRUCTOR	OFFICE	E-MAIL
Kürşat Aker	S-131	*kaker_metu.edu.tr*
Benjamin Walter	S-132	*benjamin_metu.edu.tr*

Schedule

There will be 28 lectures given by the instructors, each lasting 2 hours. A rough list of course is below **.**
Note: This schedule may be modified/reorganized as the class progresses.

Week 1	Introduction Matrices corresponding to Differentiation Operators.	
Week 2	Differences, Derivatives and Boundary Conditions. Gaussian Elimination and LU decomposition.	**WebWork I**
Week 3	Inverses and Delta Functions.	**Written Homework I**
Week 4	Eigenvalues and Eigenvectors.	
Week 5	Positive Definite Matrices.	**WebWork II**
Week 6	Equilibrium and the Stiffness Matrix. Mechanical Vibrations.	
Week 7	Projections. The Method of Least Squares.	**WebWork III**
Week 8	Review	**Midterm**
Week 9	Structures in Equilibrium.	**Written Homework II**
Week 10	Fourier Series for Periodic Functions.	
Week 11	Special Functions.	
Week 12	Discrete Fourier Transform. Fast Fourier Transform.	**Written Homework III**
Week 13	Convolution and Signal Processing.	
Week 14	Review	

Important Dates

- **February 17**: Classes Start
- **February 24-28**: Add-Drop
- **April 23**: HOLIDAY (Wednesday)
- **April 25**: Last day for WITHDRAWAL
- **May 1**: HOLIDAY (Thursday)
- **May 23**: Classes End
- **May 26-June 7**: Finals Period
- **June 16**: Letter Grades Announced
- **June 18-20**: Resit Examinations