

# MATH 210: Applied Mathematics for Engineers (Spring 2013)

**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:** [İbrahim Ünal](#) (office: RZ-33, phone: x2902, email: [uibrahim\\_at\\_metu.edu.tr](mailto:uibrahim_at_metu.edu.tr))

**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 :** 30 %
- **Final:** 40 %
- **Homework:** 30 % [3 WeBWorK 6% and 3 Written 24% = 12%(HM1)+7%(HM2)+5%(HM3)]
- **Bonus:** 5 % ( 3% for 80% attendance, 4% for 90% attendance, 5% for %100 attendance)

**Homework:** Written and Online homework will be assigned and graded during the semester. For online homework [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.

**NA Grade Policy:** Students who attend less than 50% of lectures (< 13 classes) will not be eligible to take the final exam and will automatically be given an NA grade for the course. This will also apply to students who miss the final exam without a valid excuse.

**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.*

## Instructors

INSTRUCTOR	SECTION	OFFICE	E-MAIL
<b>İbrahim Ünal</b>	Sections 2,3	RZ-33	<i>uibrahim@metu.edu.tr</i>
<b>Kürşat Aker</b>	Section 1,4	S-131	<i>kaker@metu.edu.tr</i>

## Lectures

<b>Section 1</b>	Mon 13:40-15:30 Thu 8:40-10:30	T-105
<b>Section 2</b>	Mon 8:40-10:30 Wed 8:40-10:30	TAZ-08
<b>Section 3</b>	Mon 10:40-12:30 Wed 10:40-12:30	TAZ-08
<b>Section 4</b>	Mon 15:40-17:30 Thu 10:40-12:30	TAZ-08

## 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.	<b>WebWork I</b>
Week 3	Inverses and Delta Functions.	<b>Written Homework I</b>
Week 4	Eigenvalues and Eigenvectors.	
Week 5	Positive Definite Matrices.	<b>WebWork II</b>
Week 6	Equilibrium and the Stiffness Matrix. Mechanical Vibrations.	
Week 7	Projections. The Method of Least Squares.	<b>WebWork III</b>
Week 8	Review	<b>Midterm</b>
Week 9	Structures in Equilibrium.	<b>Written Homework II</b>
Week 10	Fourier Series for Periodic Functions.	
Week 11	Special Functions.	
Week 12	Discrete Fourier Transform. Fast Fourier Transform.	<b>Written Homework III</b>
Week 13	Convolution and Signal Processing.	
Week 14	Review	

## Important Dates

- February 14: Classes Start (Tuesday Schedule)
- February 15: (Wednesday Schedule)
- February 25-March 1: Add-Drop
- April 23: HOLIDAY (Tuesday)
- April 26: Last day for WITHDRAWAL
- May 1: HOLIDAY (Wednesday)
- May 24: Classes End
- May 27-June 8: Finals Period
- June 17: Grades Announce
- June 19-22: Resit Examinations