MATH 210: Applied Mathematics for Engineers
(Spring 2015)

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   (office: TZ-42, phone: x3433, email: *kaker_at_metu.edu.tr*)

Exams and Grading: Course grades are determined by two (non-cumulative) midterm exams, and a (cumulative) final exam.

> ➢ **Midterms :** 2x30 % = 60 %
> ➢ **Final:** 40 %

Bonus: NONE.

Attendance: Not Required.

Grading Scheme: DD (min 45) – AA (min 87). Other grades distributed evenly.

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.*

Instructors

Section 1	Tue 13:40-15:30 Fri 13:40-15:30	TAZ-08
Section 2	Mon 13:40-14:30 Thu 8:40-10:30	TZ-07
Section 3	Tue 8:40-10:30 Thu 10:40-12:30	TAZ-09

Lecturers

INSTRUCTOR	SECTION	OFFICE	E-MAIL
Kürşat Aker	Section 1	TZ-42	*kaker_metu.edu.tr*
Benjamin Walter	Section 2,3	T-124	*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	---	Systems of Linear Equations Vectors, Matrices Solving Linear Systems using Row Reduction and Back Substitution
Week 2	---	Linear Systems (Continued) Introduction to Numerical/Approximate Solutions Discretization Initial value problems and Euler's Method
Week 3	§1.2 §1.3	Boundary Value Problems Matrices corresponding to Differentiation Operators Differences, Derivatives and Boundary Conditions LU decomposition.
Week 4	§1.4	Inverses and Delta Functions.
Week 5	§1.5	Eigenvalues and Eigenvectors.
Week 6	§1.6	Positive Definite Matrices.
Week 7	§2.1 §2.2	Equilibrium and the Stiffness Matrix. Mechanical Vibrations.
Week 8	§2.3	Projections. The Method of Least Squares.
Week 9		*Review*
Week 10	§2.7	Structures in Equilibrium.
Week 11	§4.1	Fourier Series for Periodic Functions.
Week 12	§4.3	Discrete Fourier Transform. Fast Fourier Transform.
Week 13	§4.4	Convolution and Signal Processing.
Week 14		*Review*

Important Dates

- **February 16**: Classes Start
- **February 23-27**: Add-Drop
- **April 23**: HOLIDAY (Thursday)
- **April 24**: Last day for WITHDRAWAL
- **May 1**: HOLIDAY (Friday)

- **May 19**: HOLIDAY (Tuesday)
- **May 22**: Classes End
- **May 25-June 6**: Finals Period
- **June 13**: Letter Grades Announced
- **June 17-19**: Resit Examinations