Course Outline

NONLINEAR FINITE ELEMENT STRUCTURAL ANALYSIS

Instructor: Fazıl Önder Sönmez
Office hours: Mondays, 15- 17, Wednesdays 14-16, Thursdays 14-16 or drop by
Office: M 4215
Phone: Office: (212) 359-7196, Mobile: (542) 780 6279
E-mail: sonmezfa@boun.edu.tr

Class hours: Mondays 13-14 (M2200), Wednesdays 11-13 (M2171)

Prerequisite: Fundamental knowledge of mechanics

Course Objectives: Gaining comprehensive knowledge in the fundamental mathematical and physical basis of nonlinear finite element structural analysis and learning the computer implementations.

Textbook: None. Use your hand-notes.

Grading:

Quizez, and projects	40 %
Midterm	25 %
Final Exam	35 %

Notes: Midterm and Final exams are closed book and notes.
Only two A4 papers are permitted containing formulas.

Tentative Course Schedule:

Topics

Introduction (Sources of nonlinear behavior (material and geometric))

Review of linear elasticity and tensor Analysis

Kinematics of large deformations, Lagrangian and Eulerian descriptions of motion

Physical equations for a solid body (conservation of mass, balance of linear and angular momentum, virtual work theorem, Lagrangian analysis)

Midterm

Nonlinear finite element formulations for quasi-static behavior

Techniques for nonlinear analysis: Newton-Raphson and arc-length techniques

Dynamic response analysis

Plasticity models

Failure modeling

Final Exam