

Boğaziçi University
Department of Physics
Computational Physics

Phys 496/68N

Fall 2011

Instructor: Taylan Akdoğan

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Office hours: By appointment.

Course assistant: Erol Ertan (ertan.erol@gmail.com)

Course schedule: TBA according to the schedules of students.

Course page: Follow the related link at <http://www.phys.boun.edu.tr/~akdogan/>

About the course: Topics to be covered:

- Linear Algebraic Equations,
- Matrix inversion,
- Numerical integration,
- Numerical solution of ODE,
- Root finding,
- Minimization-maximization of generalized functions,
- Eigensystems,
- Modeling of data - least square fitting,
- Interpolation and extrapolation in multi-dimensions,
- Random numbers and introduction to the Monte Carlo methods.
- Introduction to finite element method.

Prerequisites: Basic knowledge of any programming language. Phys 221, Phys 311, Phys 325/326 are recommended. You have to see the instructor before requesting consent, otherwise it will be declined.

Recommended texts:

Computational Physics by Koonin and Meredith (Addison Wesley, 1990)

Numerical Recipes in ... by Press, Teukolsky, Vetterling, and Flannery (Cambridge, 1992).

Homework: This will be a significant part of the learning process for this class. There will be one or two problems every week that require you to implement a numerical method. You are expected to hand in the homework on paper that includes a) Printout of your code with sufficient remarks, 2) The output of the code, 3) Analytical derivations you used in the code, and 4) Plots with axes marked clearly. In addition to this you are required to send the code by email in clear text to both the instructor and the course assistant. If you have more than one files you are required to package them (tar, rar, zip,...) before sending.

I encourage you to work collaboratively on the problems but you should understand that when you write a code, the work is to be your own (i.e., do not just copy someone's code). Do not be shy about coming to me for help with the homework or any other questions related to the course.

Problem Session: There is no problem session for this course. However, occasionally, some part of the class will be dedicated to discuss the problems you may encounter while working on the homework.

Projects: In addition to the homework, there will be two (three for Phys 68N) projects for which you will have a few weeks to finish. The projects will be chosen to be real-life physics problems that requires the knowledge you gain in this course.

Grading: The tentative weights that will determine the cumulative grade are as follows:

	Contribution
Homework	50%
Projects	50%

The final grades will be determined according to the distribution of cumulative grades and the classroom contributions.