COMPUTING FOR THE PHYSICAL AND SOCIAL SCIENCES

COS 323: Princeton University Fall 2011
Tuesdays and Thursdays 3:00–4:20, CS 104 (large auditorium)

PEOPLE

Professor: Dr. Rebecca Fiebrink (fiebrink@princeton.edu, CS 408)

Assistants in Instruction:
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DESCRIPTION & OBJECTIVES

This course will study principles of scientific computation, driven by current applications in biology, physics, economics, engineering, and other disciplines.

By the end of the semester, students will have achieved:

- Understanding of the fundamental concerns of numerical and scientific computing, including sensitivity, stability, accuracy, error, and convergence
- Exposure to standard algorithmic techniques for addressing common computational tasks, including model fitting, simulation, integration of differential equations, optimization, solving systems of equations, signal processing
- Ability to reason about tradeoffs among alternative techniques and to effectively evaluate outcomes
- Practice applying these techniques using Matlab and other software tools
- Exposure to various applications of scientific computing, and an in-depth exploration of a topic of the student's choice in the final project

PREREQUISITES

The course is appropriate for students who have taken COS 126 or the equivalent, as well as MAT 104 or the equivalent. There will be some programming in Java, and we will also be using Matlab for some of the assignments (though no prior Matlab knowledge is assumed).

TEXTBOOK

Scientific Computing, an Introductory Survey (2nd ed.)
Michael T. Heath
ISBN 0-07-239910-4 or 978-0-07-239910-3

PIAZZA

We will be using Piazza as an online forum for the course. Please post your questions and discussion there rather than emailing the instructor or TAs directly. Please sign up for Piazza at http://piazza.com/class#fall2011/cos323.

COURSE POLICIES

The assignments are due at 11:59 PM on the due date. You are given three total free late days that you can use any time during the semester. Past three late days, your grade for a late assignment will lose 50% per day (i.e., exponential decay).

You may discuss assignments with others, but everything handed in must be your own work. All code must be your own: you may not use code from your classmates, the internet, the textbook, or any other source.

We will be using CS Dropbox to submit assignments, which should be familiar to you from previous COS courses. Each assignment page will have a link to submit your files - login with your Princeton netID, and submit all applicable files by the deadline. You can resubmit and unsubmit files as needed up until the submission deadline. There is more information about dropbox at https://csguide.cs.princeton.edu/academic/csdropbox.

Please use discretion in your use of electronic devices during class. Be respectful of your classmates and instructors. No texting, no ringing cell phones.

GRADING

50% Assignments
20% Project
30% Final Exam

Borderline grades (e.g., B+/A-) may be adjusted on the basis of productive participation (asking and answering questions) in class and on Piazza.