

CS 3200: Introduction to Scientific Computation

Spring Semester 2014

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Office Hours: Th 4-5pm

Class Location & Time: WEB L103, M/W 1:25 – 2:45 p.m.

Class Info

Canvas will contain all of the resources required for the class (references, assignments, grades, etc.). Notes will usually be posted after but occasionally before class sessions.

- **Canvas:** <https://utah.instructure.com/>

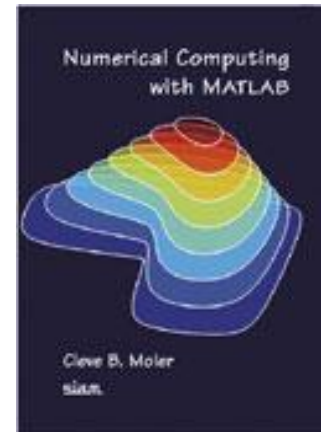
If you have a question about the class or an assignment, please send it to...

- **CS 3200 Instructor Mailing List:** teach-cs3200@list.eng.utah.edu

Text

Unfortunately, there is not a textbook that covers all of the topics for the semester. However, we will use part of *Numerical Computing with MATLAB* by Cleve Moler during the course. The book is available for free on-line at: <http://www.mathworks.com/moler/chapters.html> or you can purchase a book version at: <http://ec-securehost.com/SIAM/ot87.html>, Amazon.com & elsewhere.

Additional references can be found on the class website.



Objectives & Syllabus

CS 3200 serves as an introduction to several computational science & engineering techniques & tools, including modeling, simulation, visualization, & evaluation (rather than the numerical analysis oriented course of the past). The goal is to create a course that will be useful to engineering & science undergraduates who are interested in learning more about problem solving using a computational approach. Basic knowledge of programming, matrix operations, & calculus is assumed. Topics we'll cover during the semester related to these areas including:

- **Modeling:** continuous, discrete, & statistical modeling of problems
- **Simulation:** solving linear & non-linear systems, interpolation & approximation, numerical differential equations
- **Visualization:** surface, scalar, & vector field visualization techniques

Grades

A final course grade will be computed from the homework (60%), in-class activities (10%), midterm (10%), final exam (20%), & extra credit opportunities (up to 5%). These values are subject to some change.

Homework: Assignments will be handed out periodically throughout the semester. Most homework will consist of computational implementations of the ideas discussed in lecture plus a written report describing your results. These assignments will be small in the number of lines of code but conceptually challenging. Homework may be

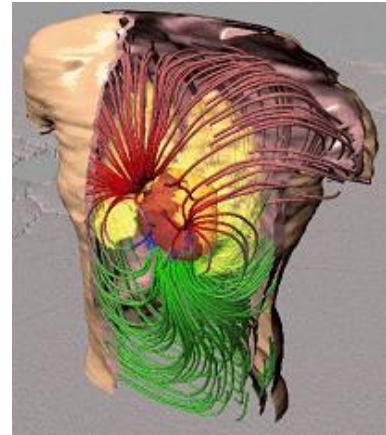
discussed in small groups, but you **MUST** write your own code & report. Finally, you must disclose those whom you collaborate with.

In-Class Exercises: You will be assigned 10 in-class exercises, which you will have 30-45 minutes to work on. You will not be graded on correctness but **EFFORT**. They will be graded on a scale of: 1% - attempted with effort, 0.5% - attempted with little effort, or 0% - not attempted. You must attend class to complete these activities. **NO MAKEUPS!**

Exams: There will be a midterm exam & cumulative final exam.

Extra Credit: You can earn 1% extra credit (5% maximum) each time you attend a SCI Institute Distinguished Lecture, Vis Seminar, or Image Lunch. To earn your credit, attend a lecture, and submit a 1-page report within 48 hours on canvas. The report should contain:

- *Your name*
- *The lecturer's name*
- *The lecture date and title*
- *One paragraph describing the problem being addressed*
- *One paragraph describing the proposed solution*
- *One paragraph describing the problem's relationship to the concepts covered in class*



Late Work

Assignments submitted late will receive a ZERO. Every student is allocated one (1) '*late pass*', which they may use on any assignment. A late pass gives the student one (1) extra week to turn in the assignment without penalty. Other exceptions to the late policy will only be made on a case-by-case basis for legitimate cause (unexpected visits to the hospital, etc.). Evidence of the cause is highly recommended (i.e. doctors notes).

Academic Honesty

I am a strong believer in collaborative problem solving. Nevertheless, you must do your own work. It is perfectly acceptable to discuss the solution to any homework problem with your classmates, but **YOU MUST COMPLETE THE ASSIGNMENT YOURSELF!** You are also allowed to use Internet resources, please cite any sources you use! If you are caught copying other students' work or not citing internet sources, on the first offense you will receive a zero for the assignment. On the second offense, you will fail the class & be reported to the Dean.

A.D.A. Statement

Reasonable accommodation is provided to students with known physical, sensory, cognitive, systemic, learning, & psychiatric disabilities. If you will need accommodations in the class, please contact the [Center for Disability services](#) - 162 Olpin Union Building, (801) 581-5020.

Tools

On most assignments you will have your choice of programming language (c/c++, java, matlab, python, etc.). Some of the tools, you will/may use include:

- **MATLAB/Octave:** Powerful mathematical & scientific programming environment
- **Python/SciPy/matplotlib:** Free scientific programming & graphing toolboxes build on top of Python
- **gnuplot:** Freely available graphing & plotting utility available on most linux/unix distributions
- **SCIRun:** Problem solving environment for modeling, simulation, & visualization of scientific problems.
- **Processing:** Java based programming environment for quick prototyping of visual data designs.

