Programming and Numerical Methods for Scientists
Phys 707 ZA
May Intersession 2010

Instructor info:
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Office: CW 32B – times to be arranged by class poll.

Course description: This course covers the fundamentals of programming and numerical methods for scientists. Students will learn to program in C++ for scientific computing purposes. Numerical methods covered include the finding of maxima, minima, and zeroes of functions, numerical solution of differential equations, numerical and Monte Carlo simulation, and analysis of data.

Suggested texts (optional):
For numerical methods:
The classic: Press, Teukolsky, Vetterling, and Flannery, *Numerical Recipes 3rd Edition: The Art of Scientific Computing.*
For C++:
Free but sketchy: http://www.cplusplus.com/doc/tutorial/ .
Very cheap and reasonably complete: J.R.Hubbard, *Fundamentals of Computing with C++.* ($20 on Amazon.)
Reasonably cheap and complete: Stephan Prata C++ Primer Plus (5th Edition) C++ *Primer Plus (5th Edition)* ($38 on Amazon)
(And there are many other C++ texts in publication.)
In principle, you won't absolutely need any books to complete the course, but *Numerical Recipes* is very nice to have, and at least one C++ book might be useful if you're new to the language.

Course structure:
First 1/3 of the course: fundamentals of computers and programming in C++ (no prior programming required).
Second 1/3: introduction to numerical methods, including some Monte Carlo methods.
Third 1/3: data analysis, including some basic statistics, hypothesis testing, and finding confidence regions.

Grading info:
Grade based on completion of in-class and out-of-class exercises.
Unlimited opportunity to correct mistakes will be given up until the last day.
100% completion = A.

Collaboration:
You are encouraged to work together on assignments, but in the end each student must complete the work by her/himself. Copying of code from other students or other sources is not acceptable.

Disabilities:
If you have any condition, such as a physical or learning disability, which will make it

difficult for you to carry out the work as I have outlined it or which will require academic accommodations, please notify me and contact the Disabled Students Office (Holton 202), in the first two weeks of the course.

Other information required to be on this syllabus:

Plagiarism:
Plagiarism and cheating are serious offenses and may be punished by failure on the exam, paper or project; failure in the course; and/or expulsion from the University. For more information refer to the "Academic Dishonesty" policy in K-State Undergraduate Catalog and the Undergraduate Honor System Policy on the Provost's web page at http://www.ksu.edu/honor/.

Honor System:
Beginning the fall 1999 semester, Kansas State University initiated an Honor System based on personal integrity, which is presumed to be a sufficient assurance that, in academic matters, one's work is performed honestly and without unauthorized assistance[**].

Undergraduate and graduate students, when they register, acknowledge the jurisdiction of the K-State Honor System. The policies and procedures of the Honor System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, as well as on-line. A component vital to the Honor System is the inclusion of the Honor Pledge, which applies to all assignments, examinations, and other course work undertaken by students.

The Honor Pledge is as follows:
"On my honor, as a student, I have neither given nor received unauthorized aid on this academic work."
[Note: this applies to all your academic work. I will not make you sign this statement: you are considered to be affirming it every time you submit any academic work for this course. Please contact me if you have any questions about the Pledge, the Honor System, what constitutes authorized and unauthorized aid, or any other questions.]

[**] To understand what assistance is authorized and what is unauthorized in this class, please read carefully the "Collaboration" section above. If anything is unclear about the course policies, the Honor System, the Honor Pledge, the definition of "unauthorized assistance", or anything else, please talk to me about it right away.