Phys 305: Computational Physics

Fall 2017

Tuesday – Thursday 9:30–10:45; PAS 272

- **Course Description**

This is a course for students of physical sciences that introduces basic computational methods for solving physical problems. The course will cover methods related to the solution of linear and non-linear equations, the numerical integration of arbitrary functions, the solution of ordinary differential equations, modeling of data, and Monte Carlo techniques.

During the course we will use the **UNIX operating system**, the **C programming language**, and the **Python** framework. No previous experience with either is required, although having completed Phys 105 will be of great help.

- **Textbooks**

Lectures notes, in the form of a typed draft, will be available on the class web page.

The suggested text: **The C Programming Language** by Kernighan & Ritchie (2nd edition) is an excellent introductory book to programming in C.

The text: **Numerical Recipes in C** by Press, Teukolsky, Vettering, & Flannery (2nd edition) has been the standard reference in the field for many years and offers an in depth presentation of all the topics that we will cover (and many more). A free, online version of the book is available at http://www.nr.com/oldverswitcher.html

- **Assignments**

The course grade will be based on 6 homeworks (50%), a term project (30%), and a final exam. A score of 90% will guarantee an A.

The **homework will be due on Fridays at 5pm** (approximately one homework set every other week). For every homework, you will be required to write a few programs in C and describe the reasoning behind them and their output. All homeworks will be turned in electronically in a manner that I will describe before the first homework is due. **No credit will be given for late homeworks** but the lowest score of the 6 homeworks will not count towards the course grade.

Each student will also have to complete, present in front of the class, and be able to answer questions on a **term project**. These projects will require the development of computer code that combines a number of the numerical methods we will discuss during the semester and will be longer and more complex than any individual homework.

The will be **no midterm** for this class. The final exam will take place in class, during the last day of classes.

Course Web Site: http://u.arizona.edu/~dpsaltis/Phys305

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General Policies

There will be no late credit for assignments.

There will be a make up exam only with a well documented, serious, and valid excuse, such as a serious sickness, death in the family, or a university function.

Cheating or any other form of unethical or threatening behavior will not be tolerated. You can find more information on these issues in the following two web sites of the university:
`http://dos.web.arizona.edu/uapolicies`
`http://policy.web.arizona.edu/~policy/threatening.pdf`

Incompletes will only be given if a student has satisfactorily completed the majority of the work in the class and has a valid reason, such as medical, for not completing the remainder of the course. Students must make arrangements with the instructor in order to receive an incomplete.

Other than grade and absence policies, the information contained in this syllabus may be subject to change with reasonable advance notice.

Students with Disabilities:

If you anticipate barriers related to the format or requirements of this course, please meet with me so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with Disability Resources (621-3268; drc.arizona.edu) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.