

Phys 305: Computational Physics

Spring 2008

Tuesday – Thursday 9:30-10:45am; 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** and the **C programming language**. No previous experience with either is required.

• Textbooks

The draft manuscript of a textbook that I am preparing for publication will be available from the course web page. The textbook will cover all the material that you will need for the course, including a short introduction to the C programming language.

For a more detailed introduction to programming, you can use the classic text: **The C Programming Language** by Kernighan & Ritchie (2nd edition).

Regarding numerical methods, the text: **Numerical Recipes in C** by Press, Teukolsky, Vetterling, & 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).

• Assignments

The course grade will be based on 6 homeworks (50%), a term project (30%), and a written final exam (20%). **You will need a passing grade in each of the three parts (i.e., 25% in homeworks, 15% in the term project, and 10% in the final exam) in order to get a passing grade in the course.** 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, write a report, 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.

Finally, there will be a written final exam on Tuesday May 13, at 8:00am, in class. The will be **no midterm exam** for this class.

Course Web Site: <http://www.physics.arizona.edu/~dpsaltis/Phys305>

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