

Contact Information

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Course Information

Lecture: 9:10–10:05 am Days MWF
Room: 319 Peter Engel Science Center (Some day Mondays in 212 PE)
Textbook: *C++ Primer Plus* by Stephen Prata
Web Site: <http://www.physics.csbsju.edu/~jcrumley/222/>

Introduction

Computer programming is a skill that is fast becoming essential for scientists and engineers. There are a wide variety of forms of programming that you might run into from programming calculators, to spreadsheets, to mathematical software, such as Matlab and Mathematica, to scripting languages like Perl or Python, to compiled languages like C++ or Fortran, to assembly language. In this class, we will attempt to give you a foundation of basic programming concepts and techniques. Only compiled languages will be taught in this course, but much of the structure of good programming carries over to other areas.

This course will be taught in C++, with some reference to Fortran and other languages. For those of you more interested in Fortran or some other programming language, you can write your programs in that language. Check with me if you would like to do that.

Homework Assignments

Homework will be assigned every day Monday and will be due the following day Monday. Beware that computer programs can take a long time to debug. Do *not* wait until the night before an assignment is due to work on a program. Also, let's try to run this class in fairly "paper-less" manner. I'll post the assignments online and the finished products should be emailed to me with a specific subject line which will be given with the assignment. Points **will** be lost for not following those directions.

Projects

There are two versions of this class. Physics 222 is for those of you who are interested in learning the basics of programming, but do not need this class to count as a Physics elective towards the physics major. Those taking this class as Physics 222 will complete 6 homework assignments.

Physics majors who would like to count this class toward their 6 credits of advanced (300) level physics electives should take this class as 322. The only difference in the class for those taking it as 322 is that they will have to complete an individual programming project, and they will not have to do the last regular assignment. This project will be on a physical problem of your choosing. I'll give you more details on this later.

Plagiarism

Plagiarism can be a problem in computer programming courses. While you are encouraged to share ideas with your classmates in order to learn how to program, it is not acceptable to copy programs from others, make minor changes, and pass them off as your own. The CSB/SJU's policy on plagiarism, which is in the course catalog, will be followed in this course.

Tests

The one test for this course will be given on the final day of classes.

Quizzes

During most classes periods there will be in-class quizzes (quick checks). There may also occasionally be other in-class exercises or out of class quizzes which count as part of this grade.

Grading

Grading for this class will be based on grades on homework assignments, quizzes (all of them together count the same as a homework assignment), the test (counts twice as much as a homework assignment), and projects (counts three times as much as a homework assignment) for those of you who do them.

References

- *Numerical Recipes (in Fortran, F90, Pascal, C, or C++)* by Press et al. – Classic book on applied numerical computing. If you need to find an algorithm or functions to solve a problem numerically, this is a good place to look.
- *Programming and Problem Solving With C++* by Dale et al. – A good introduction to C++.
- *The C++ Programming Language* by Stroustrup – A complete reference on C++ by the creator of the language.
- *Scientific and Engineering C++* by Barton and Nackman – A more advanced book that explains how to use higher level features of C++ to solve physical problems.
- *C++ for Engineer and Scientists* by Bronson – a decent book aiming to introducing C++ to scientists and engineers.
- *Computing for Scientists: Principles of Programming with F90 and C++* by Barlow and Barnett – a book at a similar level to our textbook which teaches Fortran and C++ side by side.
- *Introduction to Fortran 90/95* by Chapman – A book at about the same level as our text, but only covering Fortran. It has more complete coverage of some topics.