

PHZ4151C/PHZ5156C

A First Course in Computational Physics

Spring 2019

Instructor:

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Office Hours: Wednesday 2:30 - 4:30 PM or upon appointment

Class Meetings:

MCH 0315B, Tuesday and Thursday from 2:00 to 3:15 PM

Course Text:

Computational Physics
Revised and expanded 2013
Mark Newman

Class Website:

<http://hadron.physics.fsu.edu/~eugenio/comphy>

Overview

Computers originally developed to solve numerically intensive physics problems, have become an essential tool for modern physics. Basic computing skills in physics include problem solving using numerical solutions to differential equations, numerical integration, Monte Carlo, partial differential equations, linear algebra, distributed processing, hypothesis fitting, and statistical data analysis.

Objective

This course introduces students to the use of computers to solve physics problems and provides instruction in both computing and numerical methods. Focus is placed on using software tools which are currently being employed by major research efforts. In addition, the course also provides instruction in computational techniques and software development skills, and practice in using network and software development tools including parallel batch processing systems, code management systems, debuggers and optimizers, auto documentation generators, and web utilities.

This course is designed and intended for physics majors. It is based on developing computer programs in a Linux/Unix environment using the Python programming language. Each student receives a computer

account on the Physics scientific computing HPC, a Linux cluster consisting of over 2600 CPU's. Additional, computing resources for the course include individual computing lab workstations which students utilized to connect to the HPC computing cluster.

Expectations

It is expected that you will attend class, read the text, and ASK QUESTIONS. The instructor will cover the important material and use a variety of materials for presentations and strive to ANSWER QUESTIONS.

Course Grading

The course uses a combined lecture plus laboratory format. Students work at computer stations to complete exercises and projects that teach computational techniques and provide direct hands-on experience using software tools. Students are graded based upon the successful completion of in-class/homework exercises, and scientific programming project exams. All assignments are expected to be completed and timely submitted for grading. Scientific programming projects are to be documented in an pdf report and electronically submitted along with an archival of the written compute source code.

There will be two or three take-home (or in-class) projects during the semester which will consist of programming assignments similar to those on the in-class/homework exercises. The exams differ from the homework exercises in that collaboration is not allowed. All exam problems must be solved without consulting others or copying from external sources. There will be no final exam for this course.

Your final grade for the course will be based on performance in computational project exams (35%), in class and homework exercises (50%), and in-class participation & reading assignments (15%).

In order to fulfill FSU's Computer Competency Requirement, the student must earn a "C-" or better in the course, and in order to receive a "C-" or better in the course, the student must earn at least a "C-" on the computer competency component of the course. If the student does not earn a "C-" or better on the computer competency component of the course, the student will not earn an overall grade of "C-" or better in the course, no matter how well the student performs in the remaining portion of the course.

The table below shows the breakpoints for the spring 2019 semester.

Breakpoints	Grade
93	A/A-
90	A-/B+
87	B+/B
83	B/B-
80	B-/C+
77	C+/C
73	C/C-
70	C-/D
50	D/F

Some Sensible Advice

It will be great if everyone passes this course. Below are a few tips to help make your adventures in computing and Python fun.

- * To gain confidence on physics concepts, practice the easier problems first.
- * Attend all lecture/laboratory classes.
- * Use the textbook. You paid good money for it! Try to find time to look over a chapter before it is covered in class.
- * Come and talk to me if you need extra help.
- * Find a study partner. We strongly encourage students to study and learn together.
- * Finally, don't give up or sit for hours trying to understand the homework. Come and discuss your solution with me. Often you will be much closer than you think to being able to solve a problem.
- * Good luck and I hope you enjoy the course!

Academic Attendance Policy:

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy:

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to ". . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://dof.fsu.edu/honorpolicy.htm>.)

Americans With Disabilities Act:

Students with disabilities needing academic accommodation should:

- (1) register with and provide documentation to the Student Disability Resource Center; and
- (2) bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class.

This syllabus and other class materials are available in alternative format upon request.

For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center
 874 Traditions Way
 108 Student Services Building
 Florida State University
 Tallahassee, FL 32306-4167
 (850) 644-9566 (voice)
 (850) 644-8504 (TDD)
sdrc@admin.fsu.edu
<http://www.disabilitycenter.fsu.edu/>

Syllabus Change Policy:

"Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice."