Phys460/660 Syllabus: Spring 2020

Instructor:
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Office hours: by appointment

MWF 10:10-11:00 114 Gore Hall
Textbook: Computational Physics, by Giordano and Nakanishi

Course Objectives

- To give students hands-on experience in the application of computers to open-ended physics problems
- To train students in the standards required for publication quality work, including both writing and presentation of data
- To introduce numerical methods and the unique problems that arise when using computers to understand problems in all areas of physics
- To develop the essential skill of translating mathematically formulated problems into computer code

Requirements

This is a course about ***doing***, and therefore it is a project-based course. There are five research projects which will account for 90% of your final grade. There will be semi-weekly homework assigments that will account for the remaining 10%. There are no midterm exams and no finals. Each project requires the submission of a written report (details below).

Memo of Understanding

Due to the unusual nature of this course, students are required to sign a memo of understanding showing that they fully understand:

- The requirements for passing the course
- What plagiarism is and what are the consequences for plagiarizing

Grading.

The grading for each project is broken down as follows:

- 1/3 for writing code that solves the stated problem accurately
- 1/3 for using your simulations to understand the physics of the problem
- 1/3 for writing a journal article. (more details below)

Some hints for success.

- Begin working on the projects as soon as they are distributed. Each one requires several stages: Getting your code to work, producing the results needed for the project, making the plots and visualizations, and writing the report. If you are struggling with getting your code to work a few days before

the project is due, you are in deep shit. (Note the grading policy for late submissions. This is strictly enforced.)
- Seek help early, either from me or from your classmates, or from TA's who have taken the class in previous years. (I'll send a list of good candidates and their help center hours.)
- Come to lecture and read the text and other study materials! In lectures I will mix traditional blackboard lectures with demos and example code (via Jupyter notebooks.) Even though I will make the notebooks available on github, you will get a lot out of the lectures, if you are already actively working on the current project. Besides, it's more fun if we are engaged and working hard together.
- This class is a lot of work. You will likely hate it at times, but at the end you will have developed some really valuable skills, transferrable to almost any job you might aim for after you finish your degree.

Report Requirements.

Here is a link to a detailed description and guidelines for the written reports.

Each report is to be submitted via email to me as three separate files: The written report as a pdf and as a word processing file (either word or LaTeX), and your code. I will run your code, so it had better work.

Label these three files as follows:
project<number>_<your last name>.pdf
project<number>_<your last name>.tex or .docx
project<number>_<your last name>.m or .c etc

The report should start with a clear front page containing information akin to journal publications:

- Project title,
- Your name,
- The address of the Department you are affiliated with,
- PACS codes
- Abstract explaining succinctly the aim of the project
- Introduction
- Method
- Results,
- Conclusion.

Here is an example of an A+ report from a previous year.

Word processing and formatting

- Phys660 students are required to prepare their reports using LaTex
- Phys460 students are highly recommended to use LaTeX
- In either case, your reports must be formatted as a journal article. Templates for both MSWord and LaTeX are available at the "author guidelines" pages of most journals. Here is one example, here is another.

Grading scale:
93-100 A
90-93 A-
85-90 B+
80-85 B
75-80 B-
70-75 C+
65-70 C
60-65 C-
57-60 D+
53-56 D
50-53 D-
Below 50 F

Starting immediately after the deadline, late reports will be penalized 5 points every 24 hours.

Consequences for Plagiarism in PHYS460/660

- No credit on the project which was plagiarized.
- Reporting to the Office of Student Conduct for disciplinary action.

What Constitutes Plagiarism in PHYS460/660?

Below is a list of examples of plagiarism in our course. This list is not exhaustive, but it is simply meant to give you a general idea of what is plagiarism.

- By *Other Sources,* I mean your work done by your fellow students or work done by previous students who have taken PHYS460/660 in previous years. I also mean work in published sources, whether in textbooks, journal articles, or on the web.

1. Copying computer code from other sources. This includes complete programs and pieces of programs.
    - Note: It is perfectly fine to discuss **ideas** for solving problems and help each other find mistakes/bugs in code.
    - I encourage students to **collaborate,** just not to copy.

2. Copying plots from other sources

3. Copying pieces or whole paragraphs/pages from other sources.
    - Clearly copying a whole paragraph or page is blatant plagiarism.
    - **"Assembly-kit"** papers: Plagiarism where sentences and pieces of sentences from multiple sources are cut and pasted together to make a paper.
        - This is definitely plagiarism, even if the sentences match the ideas you were planning on writing about.
4. **Important:** Starting with a code or writeup from other sources and then adding to it or modifying it is **still plagiarism.**

Citations and References

- It is perfectly fine to use text that someone else has written, but you must:
    - Put the text in quotes or indent it to show that it is not your own words.
    - Give a reference for the source of the material.
    - **Note:** Quotes like this should comprise a very small percentage of your paper.