PHYS165

Introduction to Programming in the Physical Sciences

Spring 2016
MWF 11:00 - 11:50
CSS 1410

Dr. Matt Severson
3107 Toll Phys Bldg (office hrs)
3264 PSC (other times)
mseverso@umd.edu

TA: Richard Yang
3349 A.V. Williams
ray1994@terpmail.umd.edu

Office hours

T 2-3pm; WF 12-1pm

TTh 5:30-6:30pm

NOTE: Details in this syllabus such as number of assignments, etc should be taken as tentative. I will notify you when changes are made.

Course Description

This course gives an introduction to programming using examples in the physical sciences. At least the vast majority of the course content will be approached in the context of **Matlab**, although lecture material covering general programming concepts will be presented generically when possible. If time permits, some time will be dedicated to Mathematica and perhaps more broadly applicable programming languages such as Python or C/C++.

Homework problem sets and projects will require that you have access to a computer with Matlab installed. You can either use the computer labs on campus or download a free copy of Matlab at *http://terpware.umd.edu*.

The course will be taught using a combined lecture/laboratory approach. Note that individual class sessions may contain both lecture and laboratory components.

Prerequisites: PHYS 141, 161, or 171 (or equivalent AP test credit)

Recommended Textbook:
MATLAB: A Practical Introduction to Programming and Problem Solving, 3rd edition, S. Attaway (Elsevier, 2013).

Assignments

Over the course of the semester, I will assign roughly 4-5 "large" programming projects and 5-7 lesser homework assignments. Typically you will have around 2 weeks to complete a project and a week to complete a homework assignment. All work may be submitted electronically on ELMS. A late assignment may incur a penalty, depending on the extent and circumstances.

Each homework assignment will consist of several brief coding exercises designed to give you practice using the various elements of Matlab and programming discussed in lecture. Each assignment should be submitted as a *single* document in PDF or html format, created using Matlab publishing, Word, LaTeX, etc.

Each project will involve modeling or otherwise exploring some rather substantial numerical problem in physics or phenomenology. Some of the projects may be done in groups, with some caveats TBA later. A completed assignment will include a brief written report on the subject and your methods, the code itself, and the output from the code. You may use whatever word-processing method you prefer to write the report (Word, LaTeX, etc), but the submitted document should be in PDF format. The code itself, together with the output, should be submitted in a *single* html, .m, or doc file; if the working code is contained in multiple .m script files (for functions, etc), please create a separate document containing all of the pieces together. You may use the publishing capabilities of Matlab to create such a file in html format.

You will also have one midterm exam and one final exam for the course, consisting of some short-answer questions about basic programming concepts and some homework-like short problems to solve. Writing some code (on paper) may be required, but no actual computer work will be included. Dates will be announced well in advance.

Communicating with Me and Vice Versa

I will clearly post all announcements, assignments, due dates, and other important information on the course ELMS page. I will also use ELMS to send course-wide emails when necessary. *It is* ***your responsibility*** *to find such information on ELMS.* Please check the page regularly for updates. I will be rather inflexible in dealing with problems that arise due to your failure to know things that have been said on ELMS. I will also become irritated and likely mock you anytime you ask me a question for which the answer is either in this syllabus or otherwise on ELMS. I may or may not even provide you with an answer, depending on my mood.

That said, the TA or I will be happy to answer any other questions about course material, trouble with assignments, etc as they arise. Please feel free to send me email at any time for such reasons.

Grading Scheme

Homework	25%
Projects	40%
Midterm Exam	15%
Final Exam	15%
Participation	5%

Attendance, Religious Observances, and University Closures

Strictly speaking, I will not being taking attendance in this course, and your attendance during ordinary classes is not required.

I will nonetheless be paying attention to who is here, who is participating, who comes to office hours, etc. Playing along in these ways will be quite beneficial to you, especially in the event of borderline performance in the course. For instance, if you wind up at the cutoff between two letter grades at the end of the semester, the effort you put forth throughout the course will be pivotal in my decision as to where to draw the line. The 5% Participation in the grading scheme will allow for such discretion on my part.

All that said, if you already know Matlab and know how to code, and you're only taking this course because, *e.g.*, the Physics department is making you, I will not be offended by your regular absence in the classroom, and you will not be penalized for it, as long as you're here for exams, all your assignments are turned in promptly, and your performance is satisfactory.

If you need to miss a class, a deadline, or an exam for a religious observance or other legitimate reason, please notify me in advance, and preferably ASAP. If you miss an exam due to illness or emergency, please get in touch ASAP after the fact. In all cases, a makeup exam will be arranged accordingly.

If the University is closed due to inclement weather or some emergency situation on or near an exam day or other important date, I will contact you on ELMS with further instructions.

Academic Integrity

Programming is a very meticulous process, often requiring an extra set of eyes for finding a bug or the right approach to some issue. Working well with your classmates will be important to your success in the course. That said, it is crucial that all students create and submit *their own* assignments (except when specified otherwise in group work). One's coding habits are usually quite unique; everyone will have a different style for applying comments, naming variables, etc. It will be very easy to tell your assignments apart, and so also very easy to see if you have submitted someone else's

work. Furthermore, I, too, will be Googling the problems I assign, so it will likely be clear to me if you've turned in work pulled straight from the internet. Such garbage behavior will not be tolerated and may result in an XF grade for the course and/or further action taken by the Student Honor Council.

Students with Disabilities

Accommodations will be provided to enable students with disabilities to participate fully in the course. Please discuss any needs with me at the beginning of the semester, so that appropriate arrangements can be made. Students who are registered with DSS and plan to take exams at their facilities should provide the pertinent authorization forms (electronic format is fine) *at least* one week prior to each exam date.