PHY110C Data Analysis and Report Preparation

First Day Handout Spring 2019

Class: Unique number 55290, meeting Mondays from 5-6 in RLM 7.114

Instructor: Greg O. Sitz, Office: RLM 10.313, Office Hours: Wednesday 1-2 and Thursday 10-11:30 or by appointment.. Phone: 471-0701, email: `gositz@physics.utexas.edu`

Peer Instructors: Margaret A Duncan (margaret.duncan@utexas.edu) and Jatin Konchady (jkonchady@utexas.edu), office hours: TBA.

Course Description - This course was developed by the UT-Austin chapter of the Society of Physics Students officers in order to introduce physics, math, astronomy, chemistry, and computer science students (and students interested in those and related subjects) to the LaTeXand Mathematica programming languages for use in data analysis. While designed with preparation for PHY 353L in mind, the skills learned in this course apply to a broad array of courses and fields of study and are directly applicable to both academic and industrial applications. Students enrolling in this course would benefit from prior exposure to programming, but no experience is required.

Course Description - This course will largely follow the 'flipped-classroom' model, involving readings and homework assignments to be completed outside of class in an effort to make class-time as interactive and helpful as possible. Each week, students will complete a reading assignment from an online textbook created for this course by the Evan Ott and Will Beason. This textbook is largely technical in nature, presenting new features of LaTeXand Mathematica each week. Students will read the sections of the textbook before class, then begin a programming assignment applying the material that will be due a week or two after it is covered in class.

The text is available at: `http://eaott.github.io/data-analysis/`

During class, students will first present solutions to the assignment they completed for that week and discuss the merits and failings of particular methodologies used, in a variant of the Moore (of RLM) model of teaching. Particularly toward the end of the semester, students will engage in a debate over technologies employed in solutions (is a 3D graph with one axis of time more relatable than multiple 2D graphs? are in-line equations better for space or too difficult to read? is using built-in distribution functions more enlightening than re-writing them in a more convenient form?).

Assignments - There will be a homework assignment once every 2-3 weeks, typically due on Sunday at 11:59 PM. These assignments will be available on Canvas and are *not* the ones listed in Appendix B of the text web page (although those are good problems as well). Solutions are to be uploaded to Canvas. Uploads can be Mathematica notebooks, LaTeXsource code or PDF files as appropriate. A final project will be given in lieu of the last two weekly assignments. This project will be cumulative, incorporating the data analysis skills learned in relation to the Mathematica portion of the course, and the typesetting skills learned in relation to the LaTeXportion.

Attendance: I expect you to attend the seminar each week and to have read through and worked on at least some of the material. You are allowed two unexcused absences for the semester. If you will not be attending, please send me a note in advance telling me this.

Grading: This course is offered a credit/no-credit basis only. To get credit you need to get credit for 4 of the 5 regular assignments and you must turn in an acceptable final project. Note: there will NOT be a final exam in this course.

Academic Integrity: This course is intended to be collaborative in nature and you are encouraged to seek and provide assistance freely. However, the work that you submit should clearly be your own. Generous addition of comments is one way to clearly establish your understanding and contributions.

Additional Resources:

Instructions for getting Mathematica are at: http://license.cns.utexas.edu/

A convenient, free, cloud-based, LaTeX is Overleaf (formerly ShareLaTeX), found at:

https://v2.overleaf.com/login

A recent New Youk Times article about Donald Knuth, the creator of TeX.

https://www.nytimes.com/2018/12/17/science/donald-knuth-computers-algorithms-programming.html

Syllabus

(probable, but subject to change)

Week of	
January 21:	no class this week
January 28:	Introduction to Course; Review of End Goals; Introduction to Mathematica
February 4:	Mathematica: Simple manipulation, functions, graphing
February 11:	Mathematica: lists
February 18:	Mathematica: calculus
February 25:	Mathematica: inputting external data, analysis
March 4:	Mathematica: more data analysis
March 11:	Mathematica: matrix manipulation
March 18:	Spring Break
March 25:	LaTeX: introduction, options for use
April 1:	LaTeX: documents
April 8:	LaTeX: math, equations and tables
April 15:	LaTeX: commands and environments
April 22:	LaTeX: figures and references
April 29:	Mathematica and LaTeX: Beamer
May 6:	Mathematica and LaTeX: final project workshop

Quotes

"You do not know anything until you have practiced" -R. P. Feynman

"90% of success is just showing up" - Woody Hayes

"How often have I said to you that when you have eliminated the impossible, whatever remains, however improbable, must be the truth?" - Sherlock Holmes (Sir Authur Conan Doyle)

"The paradox is only a conflict between reality and your feeling what reality ought to be." -R. P. Feynman