Class: Unique number 55650, meeting Mondays from 4-5 in RLM 7.114

Instructor: Greg O. Sitz, Office: RLM 10.313, Office Hours: W 10:00-11:30, Th 2:00-3:00 or by appointment. Phone: 471-0701, email: gositz@physics.utexas.edu

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 LaTeX and 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 LaTeX and 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 weekly homework assignment. These assignments will be available on Canvas and are not the ones listed in Appendix B of the text web page. Solutions are to be uploaded to Canvas on average every two to three weeks. Uploads can be Mathematica notebooks, LaTeX source 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 LaTeX portion.

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 a final project.

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.
Syllabus
(probable, but subject to change)

Week of January 18: no class on Monday of this week
January 25: Introduction to Course; Review of End Goals; Introduction to Mathematica
February 1: Mathematica: Simple manipulation, functions, graphing
February 8: Mathematica: lists (first upload due on Feb. 10)
February 15: Mathematica: calculus
February 22: Mathematica: inputting external data, analysis (second upload due on Feb. 24)
February 29: Mathematica: more data analysis
March 7: Mathematica: matrix manipulation (third upload due on Mar. 9)
March 14: Spring Break
March 21: LaTeX: introduction, options for use
March 28: LaTeX: documents
April 4: LaTeX: equations and tables (fourth upload due on Apr. 6)
April 11: LaTeX: figures and references
April 18: Mathematica and LaTeX: combining (fifth upload due on Apr. 20)
April 25: Mathematica and LaTeX: combining continued
May 2: Mathematica and LaTeX: wrap up (final project upload due on May 4)

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 Arthur Conan Doyle)
“The paradox is only a conflict between reality and your feeling what reality ought to be.” - R. P. Feynman