Introduction to Scientific Programming, Data Analysis, and Visualization for Physicists

PHYS 2001
Fall 2017

Instructor Contact

Instructor: Prof. Inseok Song

Office/Telephone: 706-542-7518

Office Hours: by email appointment

E-Mail Address: song@uga.edu

Meeting Time and Room

This course is a mixture of traditional face-2-face class plus online project-based activities. During the first phase of the course (usually first 2-3 weeks), we will meet at Room 303 on Wed and Fri. Course material should be accessible from eLC.

Course Description

A hands-on introduction to practical computer programming, data analysis, and data visualization for physics/astronomy majors. Students learn the fundamentals of developing, debugging, and running programs in Python or another similar high-level programming language in a server environment as well as in a personal computer. Students will be exposed to multiple example problems of particular importance to scientific programming and data visualization. No prior programming experience is assumed.

Course Goals

- Exposure to the Python language
- Basic data I/O in python
- Scientific calculations including best fit, regression, using numpy and scipy
- Creation of publishable quality data visulaization including a basic animation
- At the end of the semester, students should feel easy to use python as a day-2-day tool for any calculation needs

Textbook

None. Relevant reading material and programming examples (including python scripts) will be provided.

Prerequisite

None

Course Outline

- Set up the python environment on your computer (install anaconda, ipython, matplotlib, numpy, & scipy)
- Very basics of scientific programming
- Several fundamental python commands
- Some essential command-line commands for iOS, Windows, & Linux
- Read/write various scientific data in python
- Create a graph in python
- User defined function/class
- Several mini projects

Missed Assignments/Make-Ups

There is no exam in this course, but there will be several mini-projects. It is very important to keep up with mini-projects.

These mini-projects are not group projects. You can discuss about the project among yourselves, however, you cannot share your own scripts with others. Shared scripts will be regarded as plagiarism.

Evaluation and Grading

There will be several (about 7 at the moment) mini-projects. Final letter grades will be based on the successful, on-time completion of these mini-projects. Although the following grade guideline is likely changed as we go through the semester, a tentative grading rubric is as follows.

- A: 100% completion of all mini-projects and assignments
- B: 1-2 missing mini-project
- C: 3-4 missing mini-projects
- D: 5 or more missing mini-projects

Disability Statement

UGA is committed to the success of all learners, and we strive to create an inclusive and accessible online environment. In collaboration with the Disability Resource Center (http://drc.uga.edu/), we work with students who have documented disabilities to access reasonable accommodations and academic supports.

For more information or to speak with a Disability coordinator, please call the Disability Resource Center at (706)542-8719, TTY only phone (706) 542-8778.

Copyright

This course may contain copyright protected materials such as audio or video clips, images, text materials, etc. These items are being used with regard to the Fair Use doctrine in order to enhance the learning environment. Please do not copy, duplicate, download or distribute these items. The use of these materials is strictly reserved for this online classroom environment and your use only. All copyright materials are credited to the copyright holder.

Technical Issues

For TECHNICAL PROBLEMS with eLC or other issues, contact: UGA's Enterprise Information Technology Services (EITS) Help Desk at 706-542-3106, oremail at helpdesk@uga.edu. You can also submit at a helpdesk request online at https://eits.uga.edu/support/request.

Additionally, there will be a forum in the online course for students to post any issues or concerns. (*Including a forum for technical issues can be a great way to help your students and encourage them to help each other.*)