

Computational Physics Workshops

Introduction to Programming in Python for Physics Students
SW505B, Times TBA

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Description: A series of workshops to introduce students intending to study physics to the applications of programming to course and research work. We will begin by introducing students to the Linux/Unix shell and then teach practical Python programming for physics.

The goal of the workshops is to give students a practical and hands on introduction to programming and electronics. We will have Linux based computers available for use at each session, but students are encouraged to come with their own computers with the required software. Installation guide and links available on my website.

Prerequisites: No programming experience needed. We will start from the basics and build the needed skills through interactive activities.

Objectives/Possible Activities

Note that this is a working sample of ideas and may change depending on number of students, time, and available hardware.

1. Basic procedural programming in Python
2. Linux/Unix shell basics and introduction to bash scripting
3. Using scientific libraries (Numpy, Scipy) to perform calculations and data analysis
4. Using Matplotlib for data visualization
5. Develop problem solving skills to approach computational solutions to a problem
6. Develop basic numerical algorithms to solve simple mathematical and physical problems

Since the activities are cumulative, attendance at all session is recommended. By the end of the workshops students will be able to write their own basic programs in Python to perform basic plotting, data analysis or other simple tasks. It will be a good introduction to programming for those who intend to take Scientific Computing (PSCB57) or the Astronomical Observing and Data Analysis course (ASTC02).

Software

If students wish to run the examples on their own computer they should have the following software:

1. Python 3.x
2. Scipy, Numpy, Jupyter Notebook
3. Matplotlib

Students having difficulty installing the software may alternatively bring an empty USB drive (min 8gb) and we can load a Linux operating system on it. They can then boot any computer directly from the USB and use the software that way. An 8gb USB drive costs \$10 at the UTSC bookstore.