Computing for Physicists

PHYS 2962

DAMIEN WEST

Today

Should be short, Just an introduction

Going over Syllabus info: material covered/class format/syllabus.

Installing some software which we will be using over the next several class meetings.

What is this class about?

This is not computational physics.

Less on the theory of numerical analysis

Leans toward the practical

Tools necessary to accomplish coursework and begin research

Format

- We meet in person. Lecture will take approx. half the time, followed by an activity.
- The activities will focus on writing small programs to apply what is learned in lecture portion. The activities will be available on the LMS and your work will be submitted to the LMS by the end of class.
- All lecture slides, activities, and HW assignments will be posted on LMS.
- There will be frequent short homework assignments. They will typically be assigned
 the day after the previous one was due. ** first HW assignment is already posted **
- There will be 4 exams. They will be open notes/internet.

Material covered (4hr course)

Linux environment, command line (bash), basic scripting

Jupyter-notebook and scientific Python libraries (e.g., numPy, sciPy, etc)

Data handling, fitting, manipulation and visualization

Root finding, numeric integration/derivative

Writing programs to numerically integrate ODEs

Random numbers, Stochastic processes

Scientific paper editing (LaTeX)

Generation of publication quality scientific figures

Solving problems analytically using Mathematica

Solving systems of linear equations using Matrix solvers.

Quantum computing basics and Qiskit

..TBD

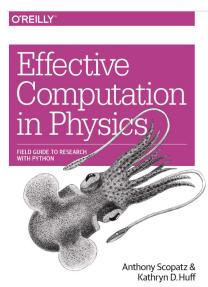
tools

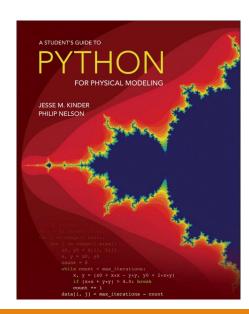
the command line(bash shell)
Python (Jupyter notebook)
LaTeX
Mathematica
Gnuplot
Qiskit

Additional Resources

useful texts.

Selected chapters will be put on the LMS under additional resources.





Grades

In class exercises (20%)

Homework (20%)

Four ("in-class") activity-based tests (60%)

Grade modifiers will be used in this class. The range for each grade is given below.

A=92 to 100

A-=89 to 92

B+=86 to 89

B=82 to 86

B-=79 to 82

C+=76 to 79

C=72 to 76

C = 67 to 72

D=55 to 67

Getting help

My office hours: After class on Tues. 3:35-5:00 pm

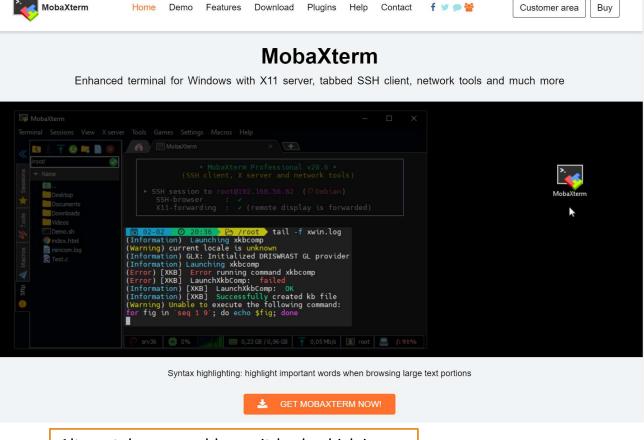
or anytime upon request/availability.

email: damienwest@gmail.com (or westd2@rpi.edu)

Class Discord server (https://discord.gg/cax9qFc6UC)

My Webex https://rensselaer.webex.com/meet/westd2

Get a bash shell (Windows Users)



Download MobaXterm

 Gives a minimal linux like environment with bash shell.

Home Edition

Free
Full X server and SSH support

Remote desktop (RDP, VNC, Xdmcp)
Remote terminal (SSH, telnet, rlogin, Mosh)
X11-Forwarding
Automatic SFTP browser
Master password protection
Plugins support
Portable and installer versions

Full documentation

Max. 12 sessions

Max. 2 SSH tunnels

Max. 4 macros

Max. 360 seconds for Tftp, Nfs and Cron

Download now

Mac users need not download.

Terminal already provides
a linux-like shell environment

Alternately, you could use git-bash which is very light weight bash shell: https://git-scm.com/download/wins

Install Ubuntu (available at Microsoft store)

To use, you need to **enable windows** If you have some alternate linux environment, then this is not subsystem for linux. necessary. -₽ Search 👂 · · · Home Gaming Entertainment Productivity Deals Turn Windows features on or off Ubuntu 20.04 LTS Canonical Group Limited . Developer tools > Utilities D turn windows - See work and web results Ubuntu 20.04 LTS on Windows allows you to use Ubuntu Terminal and run Ubuntu command line utilities including bash, ssh, git, apt and turn windows features on or off Windows Features Turn Windows features on or off System Requirements Reviews To turn a feature on, select its check box. To turn a feature off, clear its check box. A filled box means that only part of the feature is turned on. Available on ☑ SMB Direct ☐ Telnet Client PC PC ☐ TFTP Client ☐ Virtual Machine Platform Make sure ■ Windows Hypervisor Platform Description ☐ Windows Identity Foundation 3.5 ■ ☑ Windows PowerShell 2.0 Ubuntu 20.04 LTS on Windows allows you to use Ubuntu Terminal and run Ubuntu command line utilities both are ■ □ Windows Process Activation Service including bash, ssh, git, apt and many more. □ Windows Projected File System Please note that Windows 10 S does not support running this app. checked □ Windows Sandbox ✓ Windows Subsystem for Linux To launch, use "ubuntu2004" on the command-line prompt (cmd.exe), or click on the Ubuntu tile in the ■ Windows TIFF IFilter ✓ Work Folders Client To use this feature, one first needs to use "Turn Windows features on or off" and select "Windows Subsystem for Linux", click OK, reboot, and use this app. OK Cancel

Install addition software in linux: numpy and gnuplot

Enter following commands at shell:

```
sudo apt update (updates list of software)
sudo apt-get install python3 (installs python)
sudo apt-get install python3-pip (installs pip)
pip3 install numpy (uses pip to install numpy)
sudo apt-get install gnuplot-x11 (installs gnuplot)
```