

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

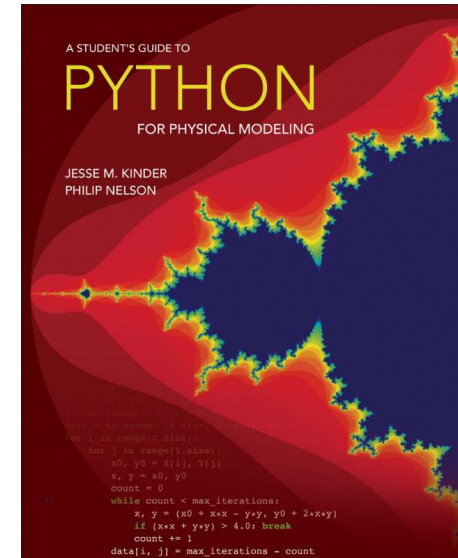
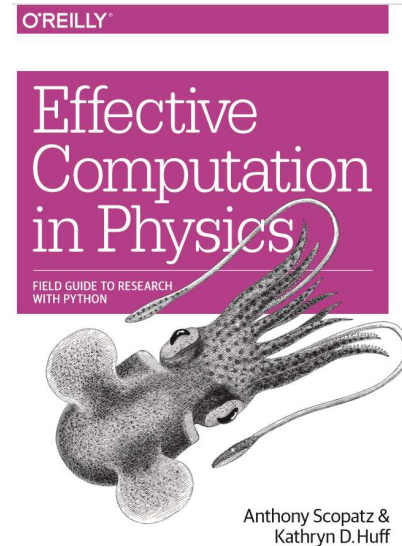
Gnuplot

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>)

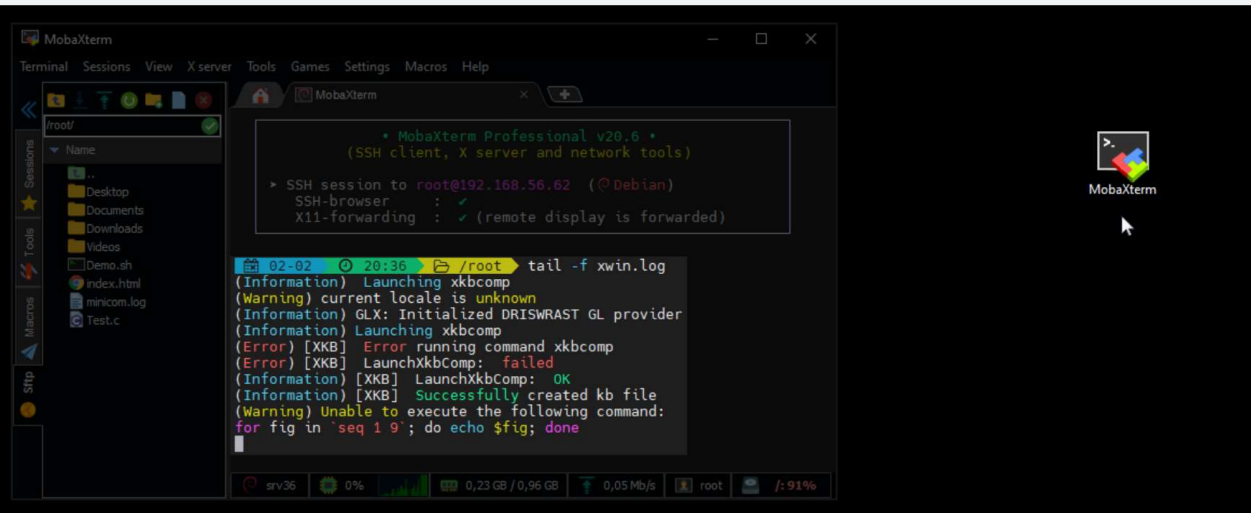
My Webex <https://rensselaer.webex.com/meet/westd2>

Get a bash shell (Windows Users)



MobaXterm

Enhanced terminal for Windows with X11 server, tabbed SSH client, network tools and much more



Syntax highlighting: highlight important words when browsing large text portions

 GET MOBAXTERM NOW!

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

Download MobaXterm

- Gives a minimal linux like environment with bash shell.

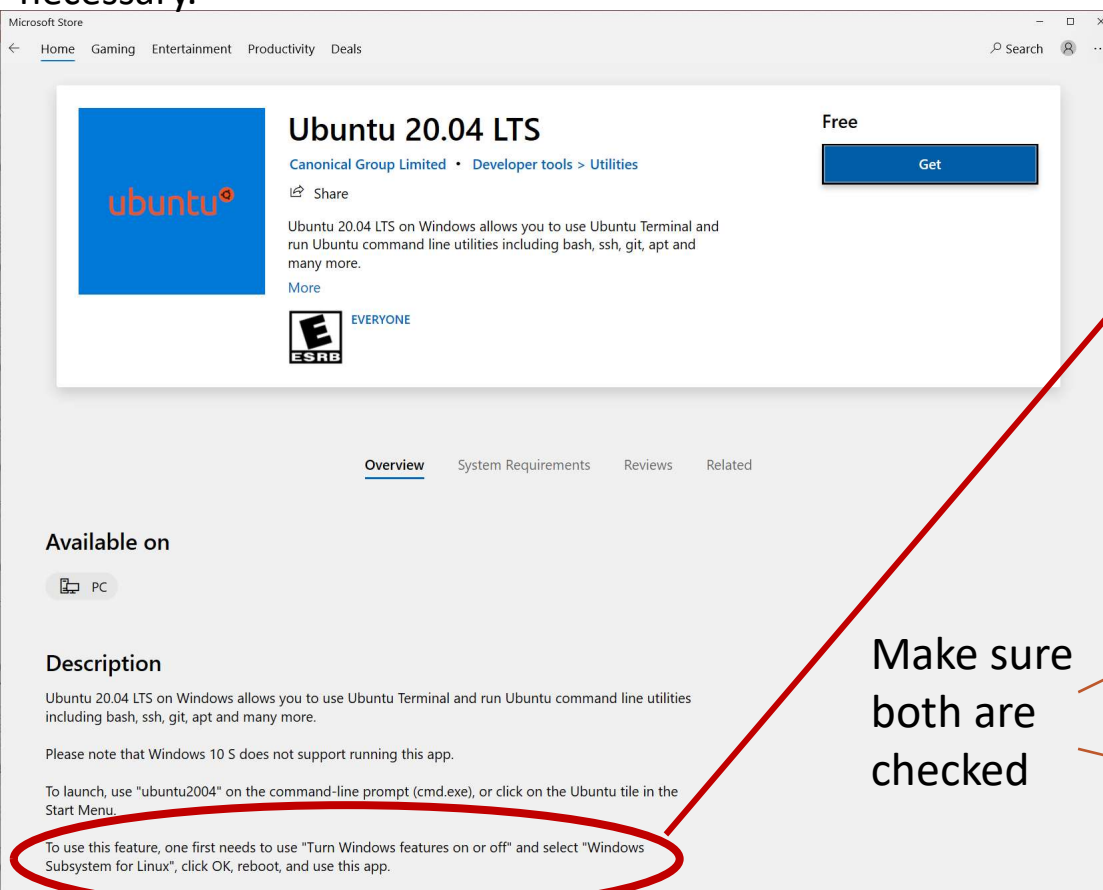
Mac users need not download.
Terminal already provides
a linux-like shell environment

Alternately, you could use git-bash which is very light weight bash shell:

<https://git-scm.com/download/wins>

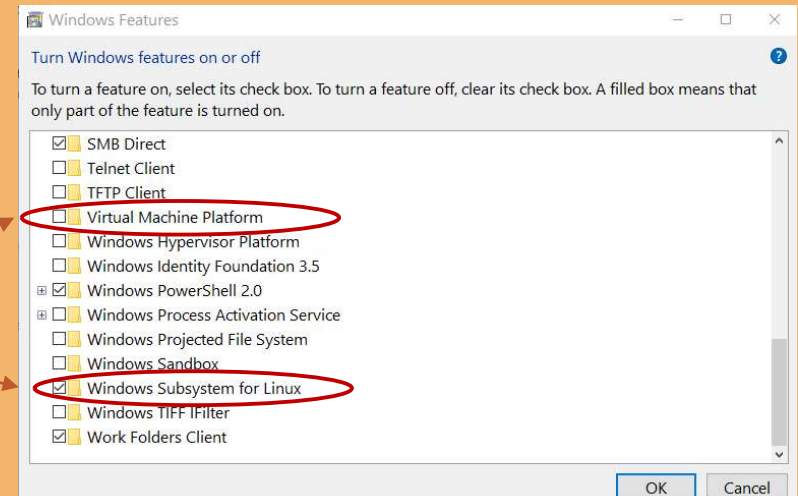
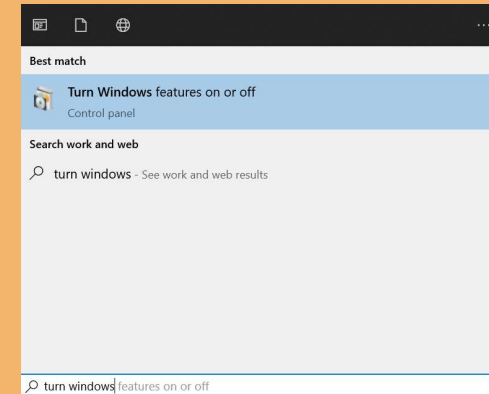
Install Ubuntu (available at Microsoft store)

If you have some alternate linux environment, then this is not necessary.



Make sure
both are
checked

To use, you need to **enable windows subsystem for linux.**



Install additional software in linux: numpy and gnuplot

Enter following commands at shell:

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