Astronomy 9505Q
Python Boot Camp – Fundamentals of Scientific Programming

Course description:

Intensive one week crash course into the world of scientific programming with Python.
This course covers the fundamentals of Python programming - scientific mathematical operations, control structures, functions, scientific libraries (numpy), file handling, and basic plotting. Version control (git) will also be covered. Morning sessions will be classic lectures, and afternoon sessions will involve collaborative assignment solving.

Instructor:

Dr. Denis Vida
dvida@uwo.ca

Office hours:

In-person or online (Zoom), by appointment.

Time and location:

September 6 – 9 (Tuesday to Friday) in two parts each day.
Morning session from 10 AM – 12 PM, afternoon session from 1 PM – 3 PM.

Room PAB 327

Prerequisites:

None, no previous programming experience is required.

Evaluation:

4 online quizzes during each afternoon session. Each quiz is worth 25%. The quizzes will open on OWL during the lecture.

Accommodated Evaluations:

Quizzes will only be accessible in a short time window during class hours. If you are unable to come to class for valid reasons (see Policy on Academic Consideration for Student Absences: https://www.uwo.ca/sci/counselling/procedures/academic_consideration_for_absences/index.html), a late submission deadline can be arranged in consultation with the instructor.

Textbook:

There is no required textbook, however the following book can serve as a friendly companion for all scientific programming endeavors even after the class:

- Effective Computation in Physics: Field Guide to Research with Python, Anthony Scopatz & Kathryn Huff, O'Reilly Media

These online materials are also highly recommended:

http://scipy-lectures.org/

https://hplgit.github.io/primer.html/doc/pub/half/book.pdf

Course materials:

All course materials are open and available on GitHub: https://github.com/dvida/UWO-PA-Python-Course

OWL Site:

Students are responsible for checking the course OWL site (http://owl.uwo.ca) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Technical requirements:

All students need to bring a portable personal computer to class with either Windows, Linux or Mac operating systems. The computers need to be able to run the following free software:

- Visual Studio Code IDE: https://code.visualstudio.com/
- Anaconda Python: https://www.anaconda.com/products/distribution

Students are encouraged to install these software packages before the first lecture.

Learning outcomes:

By the end of the course, each student will have basic operational knowledge of scientific programming in Python, with a special focus on data manipulation and visualization.

In particular, students will:

- Understand how to run basic Python commands in an IDE (VS Code, jupyter notebooks)
- Understand basic flow control and control structures (if else, loops)
- Understand how to write effective functions
- Understand how to use basic functions from built-in Python libraries
- Understand how to install and use external libraries (numpy, matplotlib)
- Understand how to do basic data visualization (line plots, scatter plots, histograms)
- Understand the importance of code documentation
- Understand how to use online resources to advance their knowledge of Python

Accommodation Policies:

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The Academic Accommodation for Students with Disabilities policy can be found at: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/AcademicAccommodation_disabilities.pdf

Academic Consideration for Student Absence

Students will have up to two (2) opportunities during the regular academic year to use an online portal to self-report an absence during the semester, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self reported absence, unless noted on the syllabus. Students are not able to use the self reporting option in the following circumstances:

• for exams scheduled by the Office of the Registrar (e.g., December and April exams)

• absence of a duration greater than 48 hours,

• assessments worth more than 30% of the student's final grade,

• If a student has already used the self-reporting portal twice during the academic year If the conditions for a Self-Reported Absence are not met, students will need to provide a Student Medical Certificate if the absence is medical, or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or

for other reasons. All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.

Religious Accommodation:

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar: https://multiculturalcalendar.com/ecal/index.php?s=c-univwo

Statement on Academic Offences:

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Support Services:

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: https://www.uwo.ca/sci/counselling/

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at (519) 661-2147 if you have any questions regarding accommodations.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mentalhealth) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, http://westernusc.ca/services