Practical Introduction to Programming for Scientists

Course Information

Catalog No   GS-QC-6301
Credits: 3
Didactic: Y
Academic Year: 20-21
Term: 1
Room: Online
Schedule: MF, 9:00-10:30am

Baylor College of Medicine

GRADUATE SCHOOL OF BIOMEDICAL SCIENCES

Course Director

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Office Hrs: Email for appointment

COURSE DESCRIPTION AND OBJECTIVES:

In this course students will learn Python, one of the most widely used scripting languages in scientific computing. The course is primarily aimed at students with little or no programming background, but those with programming experience in other languages wishing to learn Python are also welcome. The course covers basic programming concepts and data structures, and students will learn to write simple programs to improve their data processing productivity. We will also cover a number of open source scientific libraries available in Python (Biopython, SciPy, Matplotlib, etc.). Some basic familiarity with using a computer will be expected, and each student must have a laptop computer for use in class by the beginning of the term.

REQUIRED TEXTS AND MATERIALS:

No required text. Online material will be referenced in class.

PREREQUISITE(S) or EXCLUSIONS:

None

ATTENDANCE REQUIREMENTS:

Attendance encouraged, but not required. Lectures are generally recorded for online review, but sometimes fails. There will be at least one in-class mini-lab (homework grade) which will be impossible to make up outside of class.

Special note for COVID – lectures will be presented online and available for later review. Please see Blackboard for details.

GRADING:

50% homework, 50% class project and presentation (in lieu of final)
Class assignments are graded on a 0-4 scale:

    4 – Program functions largely as expected with only minor flaws
    3 – Program not fully functional, but most aspects of the assignment have been attempted
    2 – No elements of program actually functional, but a reasonable effort was made
    1 – Something was turned in, but it does not appear that much of an effort was made
    0 – Missing assignment

A total of ~8-10 homeworks over the term, with greater frequency at the beginning, shifting to time to work on class projects at the end.

Class project is to write a program to do "something useful which is not easily achieved with existing tools". Expected scope of projects will depend on previous programming experience. Each student will also give a 5 minute presentation of their project at the end of the term. 2/3 of the project grade will be based on the project itself, and 1/3 on the presentation.
3.5 - 4 = A, 2.5 – 3.5 = B, 1.5 – 2.5 = C, <1.5 = F

PROFESSIONAL CONDUCT:

Students are expected to conduct themselves in a professional manner and abide by all policies of Baylor College of Medicine, the Graduate School of Biomedical Sciences and their Programs. Any conduct not in keeping with the ethical or professional standards of BCM is defined as professional misconduct. Academic misconduct is defined as dishonesty (e.g. cheating, plagiarism, etc.) that occurs in conjunction with academic requirements such as coursework including homework and examinations.

COURSE EVALUATIONS:

The Graduate School of Biomedical Sciences seeks student feedback and opinions about the courses and lecturers in the curriculum. After the end of each term, students will receive an email request from gsbs-stars@bcm.edu to complete course evaluations. The email will include a link and unique security PIN that will provide students the opportunity to provide numerical ratings and comments about the lecturers and courses taken during the term. Ratings and comments are fully anonymous and are provided to lecturers, course directors, and GSBS administration. Over time, student input influences and improves the overall quality of the delivery of our curriculum.

GRADE VERIFICATION:

Due process involves providing students with a clear description of course expectations, including grading requirements. Students may have questions about their final grade or the grading process. If students want to verify their final grade, they are first encouraged to meet with the course director informally to discuss those questions. After grade verification and discussion, the student may choose to proceed with a formal grade appeal if they believe they have received a grade unjustly. Grievances are not the same as disagreements. A student cannot file a grievance merely because s/he disagrees with the grade. A student can file a grievance if they believe the grade was unfair, for example, if it is felt to be an act of discrimination. Formal grievances can be filed via the Integrity Hotline portal.

EDUCATIONAL CONFLICTS OF INTEREST:

Educators must strive to avoid Conflicts of Interest (COIs) that may arise in relation to academic duties. Possible COIs include: 1) Immediate family or extended family relationship to students; 2) Personal or social relationships with the student or a member of the student's immediate or extended family; 3) Business or financial relationship with the student. Students who have immediate family, extended family or personal relationships with an Educator should not participate in evaluations of that Educator. Students are expected to report an actual or perceived Conflict of Interest to the GSBS Dean or designee. See BCM Policy 23.2.04 for more details.

RESPECTFUL AND PROFESSIONAL LEARNING ENVIRONMENT:

The Baylor College of Medicine (BCM) is committed to the values of integrity, respect, teamwork, innovation, and excellence, and requires all BCM Learners to practice these values consistently during the completion of requirements for educational progression and performance of scholarly and professional duties. Creating and sustaining an environment reflective of BCM values is the responsibility of every individual at BCM. This policy outlines the expectations of academic honesty and integrity; professionalism issues relating to alcohol and substance abuse; expectations for proper management of social media and internet use along with use of BCM resources; options for reporting lapses in professionalism against learners. Learners may report alleged violations of this policy through the Integrity Hotline either by calling the toll-free Hotline number (855-764-7292) or by accessing the Integrity Hotline website (www.bcm.ethicspoint.com).

STUDENT GRIEVANCES POLICY:
https://www.bcm.edu/education/academic-faculty-affairs/student-services/student-grievances

STUDENT DISABILITY SERVICES:
Students with documented disabilities can seek accommodations from Student Disability Services at 713-798-8137 or email to the Student Disability Coordinator at disability@bcm.edu. Information about a student's disability will be kept private. The student is responsible for informing the course director of approved accommodations prior to the first examination.

SEXUAL HARRASSMENT:
Baylor is committed to providing a safe and supportive environment for all community members, guests and visitors. Individuals have the right to be free from all forms of sex and gender-based discrimination, which includes sexual harassment, acts of sexual violence, domestic violence, dating violence and stalking. Sexual Harassment is unwelcomed verbal or physical conduct of a sexual nature that is sufficiently severe, pervasive or persistent that it interferes with, denies or limits a person's ability to participate in or benefit from the College's academic environment, educational programs and/or activities, and is based on power differentials or quid pro quo, results in the creation of a hostile environment, or retaliation. To learn more about BCM policy regarding sexual harassment, discrimination, and reporting options, visit the BCM Title IX Office website or email title-ix@bcm.edu

COURSE SCHEDULE:
(may be altered during the term based on class interests and/or COVID limitations)

Date	Content	Instructor	Email Address
Aug 3	Introduction, data types	Ludtke	sludtke@bcm.edu
Aug 7	Conditions and loops	"	
Aug 10	Writing Programs	"	
Aug 14	Standard Libraries, Nested Loops	"	
Aug 17	Embedded computing, RasPi mini-lab	"	
Aug 21	NumPy, Image Processing	"	
Aug 24	Databases, Data Compression	"	
Aug 28	OOP, XML, Network Programming	"	
Aug 31	Debugging, GUI Intro	"	
Sep 4	Recursion, Regular Expressions, Parsing	"	
Sep 11	BioPython	Coarfa	coarfa@bcm.edu
Sep 14	Bioinformatics	"	
Sep 18	Machine Learning with SKLearn	"	
Sep21	JavaScript, Networking cont'd	Ludtke	
Sep 25	Linux Clusters	"	
TBD	Project Presentations, Finals week	"	