ISC4304-1 PROGRAMMING for SCIENTIFIC APPLICATIONS Spring 2019

Instructor

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Teaching Assistant

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Lectures (Beerli):

Tuesday, Thursday 9:30am-10:45am
DSL152

Lab-session (Khodaie):

Monday 2:30pm - 5:00pm
DSL 152

Office Hours

Monday 1:30pm-2:30pm or (preferred) by appointment (Beerli)
TBA (Khodaie)

Textbook

No textbook required; but you may need to read short articles supplied to you.

Overview

This course provides knowledge of a scripting language (python) that serves as a front-end to popular packages and frameworks, along with a compiled language (C++). Students will study and practice object-oriented scientific programming with the scripting and compiled language. In the laboratory component of the course students will apply the concepts learned in several science applications. Prerequisite: MAC 2312.

Learning objectives

The students will be able to ...

- evaluate the benefits of interpreted and compiled languages and know when to use each one to best advantage
- practice the conversion of mathematical formulae to computer algorithms and these to functional programs.
- understand the Python sufficiently well to program small applications with confidence
- incorporate basic algorithms coded in C++ into modules that are used in python
- through lab work, develop the skills to apply Python and C++ to a range of practical scientific applications, ranging from processing of scientific data to visualization.

Goal/Rational for the course

The students will study a scripting language, python, and will practice its use and will be able to write small programs to solve problems that can only be solved numerically. These programs are often very slow, but can be improved by incorporating other computer languages such as C++, students will practice such incorporations and also will evaluate how such changes improve the speed of the computer program.

Grading

The grade for the course will be based upon labs, homework, a midterm and a final exam. This work is weighted as follows:

- Midterm Exam (March 14, Thursday 9:30am-10:45pm)- 25%
- Final Exam (April 30, Tuesday 10:00 - 12:00 noon) - 20%
- Homework (weekly with lapses) - 15%
- Quizzes (irregular) - 10%
- Labs (weekly) - 30%
- Attendance – will be used to round up/down in cases when the number grade will be **near [2 points]** a change point.

Final grades will be given as:
A: 100-93, A-: 92-90, B+: 89-87, B: 86-83, B-:82-80, C+: 79-77, C: 76-73, C-: 72-70, D+: 69-67, D:66-63,D-:62-60, F 59-0); rounding as usual at 0.5.

Attendance

You should attend class. If you fail to attend, I would like to know why; but I will not penalize explicitly for occasional/rare missed classes [but see under grading]. Exemptions are accepted for sickness (please stay home if you have a fever or a cold! – tell me by email before!) and the attendance of scientific conferences or sports events (if you are on the FSU team). Students, not the professor, are then responsible for bringing themselves up to date both on subject matter covered during class, as well as completing homework assignments in a timely manner. Information given in class supplants information provided on the course web site.

Courtesy

Keep your cell phone in your pocket!
You must get to class on time because often informations and instructions given at the beginning class; late arrivals will be noted. If you must leave class early, please let the instructor know **before** class begins.

Assignments

The assignments consist of homeworks and lab-reports. We use Canvas as dropbox for the assignments.

- Homework: Each **homework** assignment must be sent as a PDF to beerli@fsu.edu. The PDF MUST have a filename with your lastname and the homework-number, for example beerli1.pdf, khodaie2.pdf. I will deduct 10 points (out of 100) for not following these submission guidelines. Contents for each homework will be graded for correctness and being concise, but wordy enough that I can follow your thought-process.
- Lab reports: Each lab-report may consist out of code and/or a report. If you have two or more files make a folder with your name and labnumber, e.g. beerli1, include all files and then package the folder using zip or tar.gz. Deviations, such as submitting multiple attachments, submitting the report as word file, or packaging both as a .rar file will be penalized by 10 points out of 100.

We will compare homework and lab reports potentially using Turnitin and other comparison tools. If you cheat on labs or homework and we find out, I will report to the FSU

Late Assignments

Homework and Labs have to be turned in on time, if this is difficult for you talk to the instructor BEFORE the due date. We also offer help if the assignment seems too difficult for you at the time you receive it. Exceptions to this rule are made only if extenuating circumstances (such as illness, etc.) arise which can be documented.

Student responsibilities

Learning a new programming language is difficult, you will need to prepare for every class by reviewing the past material because new material almost always builds up on knowledge already learned. Assignments can be discussed with other students but never use code from your friend, write it yourself! If you have problems see Tara or me for help.

University Attendance Policy

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to *"... be honest and truthful and ... [to] strive for personal and institutional integrity at Florida State University."* (Florida State University Academic Honor Policy, found at http://dof.fsu.edu/honorpolicy.htm.)

Americans With Disabilities Act

Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Student Disability Resource Center; and (2) bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class. This syllabus and other class materials are available in alternative format upon request. For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center
874 Traditions Way 108
Student Services Building
Florida State University
Tallahassee, FL 32306-4167

voice: (850) 644-9566
TDD: (850) 644-8504
sdrc@admin.fsu.edu
http://www.disabilitycenter.fsu.edu/

Free Tutoring from FSU

For tutoring and writing help in any course at Florida State University, visit the Academic Center for Excellence (ACE) Tutoring Services' comprehensive list of tutoring options - see http://ace.fsu.edu/tutoring or contact tutor@fsu.edu for more information. High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

Syllabus Change Policy

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.

Class content

- Overview and your first python program (Tuesday)
- basic syntax
- functions
- lists, dictionaries, sequences
- modules
- files, I/O
- interaction with the operating system
- text processing
- numpy for arrays
- classes (object orientation)
- numpy for statistics
- graphical user interfaces (potentially)
- C/C++ and wrapping using Boost/Python
- Cython
- speed up python for science applications