ATMOSPHERIC SCIENCES 5020
Environmental Programming

Fall 2015. 1.5 Semester Units. First Half of Semester
MW 1:25-2:45 PM (M L1 1110)

Instructor: Professor John Horel. INSCC 483. Office (801) 581-7091. Cell (801) 870-9450. john.horel@utah.edu. Office hours: By appointment

Teaching Assistant: Adam Abernathy INSCC 480. adam.abernathy@utah.edu. Office hours: By appointment.

Emails sent to John or Adam to arrange for an appointment or to discuss a class-related topic should include ATMOS 5020 in the subject line.

Online resources: Access through your courses in the Canvas CIS system


Highly recommended, but not required. A Hands-On Introduction to Using Python in the Atmospheric and Oceanic Sciences. Chapters can be downloaded for free from http://www.johnny-lin.com/pyintro/ (Links to an external site.)

Prerequisite: MATH 1210

MATLAB: Downloading and installing the student version of MATLAB on your own computer is an option, but the assignments requiring Matlab can be completed using classroom workstations at no cost to you. You need to be using Matlab R2013a or later.

Course Description:
Learning to program is similar to learning a new language: (1) it is hard to do, (2) it is easier for some people than others, (3) it is difficult to learn how on your own by just reading a book, and (4) it requires practice, lots of practice. This course focuses on the fundamentals and selected applications of scientific computer programming relevant to environmental fields. Environmental scientists need the ability to acquire and process environmental data and communicate results based on that processing efficiently. While self-contained tools such as Excel can be used effectively, they do not develop the programming practices needed by environmental scientists.

Skills necessary to solve physically-based problems using computational resources and methods are stressed. This 7-week short course focuses on the linux computing environment using both the proprietary Matlab and open source Python...
languages. Programming concepts independent of language syntax are stressed. Basic concepts are introduced in parallel with applications to environmental fields, including analyzing and visualizing environmental data.

**At the end of the course, you will be able to:**

- Perform basic scientific calculations relevant to environmental fields using MATLAB and Python
- Use best practices to design, write and debug computer programs
- Develop confidence to modify example codes to obtain new capabilities for the underlying code (i.e., progress onward from cookbook-style programming)
- Employ techniques to access, process, and visualize environmental data sets on Linux computers

---

**Course Format: Teaching and Learning Methods**

- This course requires you to begin and complete assignments as they are assigned-you must complete and turn in assignments by the assigned due date. There is no credit for late work without approval in advance to do so.
- Much of the instructional material will be online as pdf’s of the powerpoints with "Check Your Understanding" assignments due prior to lectures on those subjects.
- Class sessions will be held in a Marriott Library computer lab (1110 MLIB) that allows for a mix of instructional styles (e.g., brief lectures, follow along with the instructor and TA, and independent lab work). However, you will need considerable time beyond the scheduled class hours in the lab to complete assignments- many computing labs are available on campus.

**Class Policies and Grading**

Grades will be determined from class attendance and on-line quizzes (30%) and assignments (70%). Plagiarizing, copying, or otherwise misrepresenting ones’ work will not be tolerated and will be dealt with as harshly as permitted under University Policy. Do not break the scientific code of honor. Final grades are based on the following scale:
> 90 % guarantees an A or A-; > 80 % guarantees a B+, B, or B-
> 70 % guarantees a C+, C, or C-; > 60 % guarantees a D+, D, or D-
< 60% may result in an E

Cutoff points for the specific grades are identified to define reasonable distribution of grades.

**Course Outline**

- Week 1. Aug 21. No class due to eclipse. Online assignment. Aug 23. Course overview, objectives, finding the right resources (Matlab or Python, github, online training, api services), intro to linux
• Week 4. Sep 11. Matlab GUI and basic syntax Sep 13. Matlab arrays
• Week 6. Sep. 25. Python basic syntax Sep. 27. Python lists and numpy arrays
• Break Week. Last assignment due as specified in assignment

---

ADA Accomodations

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.

Additional Information Regarding Faculty and Student Responsibilities.

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee.

The syllabus is not a binding legal contract. It may be modified by the instructor when the student is given reasonable notice of the modification.