11:670:212 Computational Methods for Meteorology
Course Syllabus
Spring 2020

Instructors:	Dr. Enrique N. Curchitser	Dr. Steven G. Decker
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	Office Hours: By Appt.	Office Hours: W 1:30–3

Textbooks: Required- *Learning Scientific Programming with Python*, by C. Hill (**H**)

Supplemental- *A Hands-On Introduction to Using Python in the Atmospheric and Oceanic Sciences*, by J. W.-B. Lin (PDF on Sakai)

Learning Goals

Upon completion of this class, students will be able to:

1. Effectively communicate scientific information orally and in writing, including by electronic means, at an appropriate level for their audience. (PLG 4)
2. Demonstrate mastery of the mathematical and physical foundations of meteorology and climatology as well as key atmospheric processes that occur at a variety of spatial and temporal scales. (PLG 5)

Grading:			
	In-Class Exercises	10%	
	Homework	40%	
	Midterm Exam	20%	(Thursday, March 12)
	Final Project	30%	

Assignments:

Programming practice is an essential part of the class. Most Thursdays will begin with short in-class exercises, based on the material covered on Monday. These exercises will be due 15 minutes after the beginning of class. Ten homework assignments will be given, each worth 4% of your grade. These assignments will be announced on Mondays, due the following weekend, and pass/fail in nature. A second chance will be provided for any homework assignments graded "fail". Details on the mechanics of receiving credit for these assignments will be discussed in class. Additionally, one class period will be devoted to an in-class, open-book midterm exam in which you will solve programming problems similar to those assigned as part of your homework. The course culminates in a final project, to be submitted via Sakai no later than May 6, in which you will carry out a small research project that involves the computational tools learned in this class. The instructors will provide suggestions, or you may choose your own.

Schedule

Date	Subject	Reading
1/23	Course overview; Introduction to Computing Tools	**H** 1
1/27*	Variables and Logic	**H** 2.1–2.2
1/30†		
2/3*	Strings	**H** 2.3
2/6†		
2/10*	Lists and Loops	**H** 2.4
2/13†		
2/17*	Controlling the Flow of Your Program	**H** 2.5
2/20†		
2/24*	I/O; Working with netCDF Data	**H** 2.6
2/27†		
3/2*	Functions	**H** 2.7
3/5†		
3/9	Simple Plots	**H** 3
3/12	**Midterm Exam**	
3/23*	Dealing with Errors and Using Dictionaries	**H** 4.1–4.2
3/26†		
3/30*	Arrays with NumPy	**H** 6.1–6.3
4/2†		
4/6*	More Complicated Plots	**H** 7
4/9†		
4/13*	MetPy	
4/16†		
4/20 4/23 4/27 4/30 5/4	Work on Final Projects	
5/6	Final Projects Due (no final exam)	

Although we will not have a formal assignment on Chapter 5, we will make use of IPython and the IPython Notebook (renamed the Jupyter Notebook and now JupyterLab since this textbook was published) over the course of the semester, so we encourage you to examine that chapter from time to time on your own.

* Homework will be assigned on this date.
† In-class exercise.