PYTHON FOR ATMOSPHERIC SCIENTISTS
ATMS-235
Fall 2025

Course Description: An introduction to coding and data analysis in Python with an emphasis on meteorological and environmental applications. Topics covered may include data types, programming logic, loops, and conditional statements. No prior coding experience is expected or required.

Class Meetings: TuTh 8:15–9:30a.m. in RRO 238
Credit hours: 3

Professor

Dr. Caitlin Crossett

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Office Hours: M 2–3 p.m., and TuTh 10–11 a.m. or by appointment: https://calendly.com/ccrosset

GENERAL INFORMATION

Helpful Resources: (1) Official Python 3 documentation: https://docs.python.org/3/

(2) H. Fangohr (2022). Introduction to Python for Computational Science and Engineering. https://fangohr.github.io/introduction-to-python-for-computational-science-and-engineering/book.pdf

Webpage: The course page on Moodle will provide lecture slides, announcements, assignments, and sources of additional information. Please get in the habit of checking it frequently.

Visit http://www.atms.unca.edu/slos.shtml for a list of the student learning outcomes for the Department of Atmospheric Sciences.

ASSIGNMENTS

Problem Sets: You will have four problem sets throughout the semester to help build your coding skills. You are encouraged to work together, but I expect that the work you turn in is your own.

Data Analysis Project: Towards the end of the semester, you will be assigned a data analysis project which will allow you to analyze a real meteorological dataset in which you will have to integrate several concepts you've learned throughout the semester.

Exams: There will be two open note exams in this course. They are due 24-hours after they are assigned in class. They are each worth 10% of your grade. No extensions will be given.

In-class Exercises: Most classes will start with a short exercise which will allow you to practice coding skills learned in previous class meetings. These exercises will be graded and account for 5% of your course grade.

Labs: Lab exercises will be started in class and will allow you to practice concepts/ tools learned during lecture. They will be due the class period following when they are assigned.

Attendance/ Participation: Your attendance and active participation in class is essential to your success in this course. Participation each day will be assessed on a 0–1 scale where a score of 1 means you came to class on time and participated in class activities, a score of 0.5 means you did not come to class on time (more than 10-minutes late) but you participated (or vice versa), and a score of 0 means you were either absent or late and did not participate.

Assignment	% of Grade
Problem Sets	35%
Data Analysis Project	20%
Exams	20%
In-Class Exercises	5%
Labs	15%
Attendance & Participation	5%

A	92–100	C	72.0–77.9
A-	90.0–91.9	C-	70.0–71.9
B+	88.0–89.9	D+	68.0–69.9
B	82.0–87.9	D	60.0–67.9
B-	80.0–81.9	F	< 60.0
C+	78.0–79.9		

COURSE POLICIES

Late Work: I will accept late work for a 10% per day late penalty. You will each be granted one life token which allows one 48-hour extension on one assignment (except for exams) for no penalty. You must clear this extension with me no less than 24-hours before the due date.

Academic Honesty: Any act of plagiarism, cheating, or use of unauthorized material or assistance is academic dishonesty. A person who knowingly assists another in cheating is likewise guilty of cheating. We will spend a significant amount of time in this class discussing how to correctly cite others work to avoid plagiarism. It is up to my assessment of the gravity of the offense, that a student who violates academic honesty may receive a failing grade, a grade of zero for the assignment or test, or a failing grade in the course. I expect that you will exercise integrity in all assignments. Please email me or come see me during office hours if you have additional questions or need clarification on any point.

Technology Use: You are expected to bring your laptop or tablet with you every day in class. If you do not have one, please let me know as we have departmental laptops to loan out. I do expect that devices are only used for things related to course discussion. Watching TV, doing work for other classes, or anything else not related to course discussion will result in a zero for attendance/ participation for the day.

Artificial Intelligence Tools Policy: I encourage you to use AI-content generators responsibly and not rely on them to do the work for you. They should be used as a tool to help you learn and not as a tool to do the thinking for you. Relying heavily on AI tools will spell more work for you down the road in upper-level ATMS courses, research positions, or future jobs. I reserve the right to request an in-person conference with you to explain your work on homework, labs, and exams if I suspect

you are using AI tools to complete work for you. If you cannot explain your work, you risk losing points on the assignment in question.

Communication: I will primarily contact you about course information through email or Moodle so please get in the habit of checking both every day! Therefore, email is also the best way to reach me with any questions/comments/concerns (ccrosset@unca.edu). I will monitor email from 8a.m.–5p.m. during the work week and intermittently outside of these hours and during the weekend.

Respectful Classroom Environment: I ask that everyone be respectful of other students, the instructor, and any guest presenters while in class. Just as you expect others to actively listen to your diverse set of thoughts and perspectives, I ask that you do the same.

UNIVERSITY RESOURCES

Accessibility: UNC-Asheville values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to this class should let the professor know, and/or make an appointment to meet with the Office of Academic Accessibility as soon as possible. To make an appointment, call 828.232.5050 or email academicaccess@unca.edu. Learn more about the process of registering, and the services available through the Office of Academic Accessibility here: accessibility.unca.edu

Mental Health Support: As a student, you may experience a range of challenges that can interfere with learning, such as stressful life events, experiences of anxiety and/or depression, self-harm, substance use, and/or unusual difficulty with ordinary life activities. The increased stress of school can also make existing mental health struggles more difficult to manage. Support is available and treatment can help. Learn more about the confidential mental health services UNC Asheville provides to support student success at https://www.unca.edu/life/health-counseling/. The Health and Counseling Center is located at 118 W.T. Weaver Boulevard. Appointments can be made by calling 828-251-6520. A UNC Asheville counselor on call is available after 5 p.m. and on weekends; the counselor on call can be accessed by calling the UNCA Campus Police dispatcher at 828-251-6710. Additionally available after hours and on weekends, call the Bulldog Health Link at 1-888-267-3675, where you can get immediate support for mental health, medical consultation, concern for a friend, and/or community resources. In case of an emergency, you can also call RHA's Mental Health Mobile Crisis Unit at 1-888-573-1006.

COURSE SCHEDULE (subject to change) – ATMS 235 – Fall 2025
Assignments are due in class on the day that they are listed on the course schedule.

Week	Date	Topic	Assignment
1	19-Aug	Introduction & Programming Logic	
	21-Aug	Anaconda installation and set up	
2	26-Aug	Strings	
	28-Aug	Strings	
3	2-Sep	For Loops	
	4-Sep	*For Loops Lab (sections 1 and 2)*	**Problem Set 1**
4	9-Sep	Lists	**For Loops Lab (sections 1 and 2)**
	11-Sep	Lists	
5	16-Sep	*For Loops Lab (sections 3 and 4)*	
	18-Sep	numpy arrays	**For Loops Lab (sections 3 and 4)**
6	23-Sep	numpy arrays	
	25-Sep	numpy arrays	
7	30-Sep	*Conditional Statements Lab*	**Problem Set 2**
	2-Oct	User-defined functions	**Conditional Statements Lab**
8	7-Oct	NO CLASS - Fall Break	
	9-Oct	**Midterm Exam**	**Due Friday 10-Oct at 9:30 a.m.**
9	14-Oct	*Linux filepaths Lab*	
	16-Oct	pandas DataFrames	**Linux Filepaths Lab**
10	21-Oct	pandas DataFrames	
	23-Oct	pandas DataFrames	**Problem Set 3**
11	28-Oct	pandas DataFrames	
	30-Oct	pandas DataFrames Lab	
12	4-Nov	netCDF (xarray)	**pandas DataFrames Lab**
	6-Nov	netCDF (xarray)	
13	11-Nov	Data analysis project	**Problem Set 4**
	13-Nov	Data analysis project	
14	18-Nov	NO CLASS - UG Research Symposium	
	20-Nov	metpy	
15	25-Nov	metpy	**Data Analysis Project**
	27-Nov	NO CLASS - Thanksgiving Break	
16	2-Dec	metpy	
Thursday	4-Dec	**Final Exam Due at 10:30a.m.**	