

Department of Geography and Environmental Science  
Hunter College (CUNY)

**PGEOG 13000**  
**WEATHER AND CLIMATE LAB - SECTION 2L03**  
**SPRING 2024 SYLLABUS**

**Day/Time:** Tuesdays 6:00 – 7:50 PM  
**Mode of Instruction:** IN PERSON  
**Room:** HN1028 (Hunter North)

**Lab Instructor:** Natalie Monterrosa  
**Email:** [nmonterrosa@hunter.cuny.edu](mailto:nmonterrosa@hunter.cuny.edu)  
**Office:** HN1032 (Hunter North)  
**Office Hours:** Thursdays 10:30 – 11:30 AM

**\*\*** We can schedule a Zoom meeting based on need and availability. Please see me during or after class or send an email with a detailed description of the question or request and we can schedule a date and time to meet. **Be sure to write the Lab section in the subject line and include your full name in the body of the email.** I will try my best to answer all emails within 24 hours, and within 48 hours on the weekends.

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### **COURSE DESCRIPTION**

This is the lab section of the PGEOG 13000 Weather and Climate course, which has a lecture and laboratory component worth 4.0 credits (5 hours). The course fulfills the Hunter Common Core C, Life and Physical Sciences, and the General Education Requirements GER 2/E (Natural Science). There are no prerequisites. The course (lecture and lab) is an introduction to meteorology and atmospheric sciences. It includes the structure and composition of the atmosphere and the elements that affect it, such as pressure, humidity, and temperature. It examines the development of various weather phenomena, such as cloud formation, fronts, storm systems, severe weather, and reviews essential weather forecasting and analysis techniques. The course explores short- and long-term climate processes and their impact on the environment and people. It also demonstrates how different regions of the world have been and will be impacted by climate change in the past, present, and future. This is a laboratory science course, and the concepts covered in the lecture will be demonstrated with hands-on and technology-based activities using a variety of exercises and observations. In several lab exercises, we will be using mathematical formulas, calculations, and graphs. Lab exercises are designed to further your understanding of these concepts through application and analysis.

### **EXPECTED LEARNING OUTCOMES**

Upon successful completion of PGEOG 13000, Weather & Climate Lab, students should be able to:

1. Describe and explain the basic elements that determine everyday weather, severe weather patterns and climatological features across the earth.
2. Explain the relationship between the Sun and the Earth and the Sun's planetary impact on weather and climate.
3. Recognize the interaction between the elements of the atmosphere, including (a) the composition and the structure of the atmosphere; (b) the atmospheric and oceanic circulation processes, fronts, storm systems, and severe weather; (c) interpret methods of weather forecasting and create basic weather maps.
4. Distinguish, analyze, and evaluate climate processes and how they relate to the past, present, and future climate and their impact on biogeography, including (a) current technology and science in predicting meteorological outcomes, (b) natural and anthropogenic climate change, and (c) the impact created by shifts in climate zones.

## MATERIALS

### Required Lab Manual:

**Greg Carbone, *Exercises for Weather and Climate, 9th ed.* Pearson, 2016 ISBN-10: 0134041364, ISBN-13: 9780134041360**

We will be working on lab exercises from the manual in class. You may use a hardcopy or the e-text version. You may write your answers on a separate piece of paper. The e-text is not recommended if you want to print a hardcopy due to alignment and other printing errors. There is also a reserved copy of the manual in the Hunter Library (Call Number: QC981 .C34 2016) if you want to make copies.

Please note that hard copies of the lab exercises will not be provided in class. You must have (purchase/rent/copy) the required materials no later than **Feb 6, 2024**.

Optional: Calculator, protractor, pencils, colored pencils, eraser, and paper (for notetaking).

## CLASSROOM POLICIES

**Attendance is taken every class.** It is important that you attend every session to work on in-class lab exercises and prepare for Blackboard assignments. If the material is covered in class, there is a high probability it will be a question on the Blackboard assignment. In addition, there will be a short lecture at the beginning of every session. I encourage you to ask questions and participate in discussions during this time. As a reminder, class participation constitutes 20% of the final lab grade. Please adhere to the following guidelines during class sessions:

- Lecture and class notes should be taken using pen or pencil and paper.
- All cell phones must be silenced.
- Texting and other non-class related smart phone activities are not allowed. Students should quietly excuse themselves from the classroom if substantial external electronic communication is required.
- Tape recording is not permitted (proper documentation must be provided to grant an exception)
- Laptops, iPads, tablets, and other electronic devices may be used **ONLY** for lab assignments during class time.

Please be respectful of yourselves and each other. Inappropriate behavior in our language and/or conduct will not be tolerated. At times we will be working in groups and all students are expected to abide by classroom policies to provide a more productive learning environment.

All people have the right to be addressed and referred to in accordance with their personal identity. In this class, we will have the chance to indicate the name that we prefer to be called and, if we choose, to identify pronouns with which we would like to be addressed. I will do my best to address and refer to all students accordingly and support classmates in doing so as well. If there is a name or pronoun(s) you prefer to be addressed by, please approach me in class, send me an email, or mention it to me privately during office hours and I will add this information to my course roster.

Due to the ongoing COVID-19 pandemic, we must continue to adhere to all guidelines from CUNY. [COVID-19 Info – The City University of New York \(cuny.edu\)](#). You are no longer required to wear a mask. However, since we will be working in groups, wearing a mask is highly recommended. **If you are not feeling well, please do not come to class.** Send an email and we can discuss how and when you can make up any missed assignments. If you have any other health or wellness related questions or concerns, please let me know as soon as possible.

## GRADING RUBRIC (LAB)

Assignments/Participation	% of Final Lab Grade	Description
Lab assignments	80	All assignments completed on Blackboard including Tests and Discussion questions.
Class participation	20	This includes all exercises completed in class as well as individual participation, and group activities.

This is a combined course, including both lecture and lab (**Lecture: Prof. Allan Frei**). Please see your lecture syllabus for more details. **Your final lab grade is 30% of your final (lecture and lab combined) grade.**

Think of it in terms of points, for example:

30% = 30 points

If you get an 80 as a final lab grade, you multiply that by .30. The result = 24. That means you earned 24/30 points for the lab component.

### Extra-Credit

*EcoCredits* (Outdoor activities):

Our student club the Greenbelt Society, in collaboration with institutions such as the NYC Parks and Recreation Department and the American Littoral Society will be organizing and/or participating in several outdoor activities such as coastal clean-ups and tree planting during this semester. We will discuss in more detail the potential to earn extra credit towards the final lab grade.

### LAB ASSIGNMENTS

Lab exercises from the manual will be completed in class, individually or in groups. **All assignments and discussion questions posted on Blackboard (graded) will be due the following week. Due dates will be posted on Blackboard.** If you must turn in a physical lab to be graded, please make sure your handwriting is legible and you use proper grammar in your responses. (Example: use “because” instead of “b/c” or “at” instead of “@”). Discussion questions should be answered with at least 3 – 5 complete and thoughtful sentences to receive full credit. If you miss a class session, you are still expected to complete the assignment and submit it on time. **You will be allowed ONE late lab. Any late labs thereafter will be subject to a 10 point/day penalty (including weekends). No labs will be accepted after the last day of class. Exceptions will be made on a case-by-case basis and must be addressed immediately.** Please let me know if you have any questions or concerns.

**I take academic responsibility and honesty very seriously.**

Please be mindful of assignments and due dates. Although we will be working in groups, your responses must be your own. This includes lab assignments as well as discussion questions given on Blackboard. My penalty for plagiarism or cheating will result in giving you an automatic zero for the assignment for the first time, an F for the course if it is repeated. The college may also take further disciplinary action which can negatively impact your academic standing. If you find the work challenging or need extra help with lab assignments, there are resources available to help you. Tutoring is normally offered for this course every semester, and I encourage you to utilize it when available. In addition, I will post additional resources after class sessions to assist you in completing the “test” assignment given on Blackboard. I will also be available during office hours and via email if you need further help.

# WEEKLY SCHEDULE

**\*\*subject to change\*\***

## *Week 1*

### **January 30:** Lab 1A (See Blackboard)

- Units and Dimensions (Review)
- Latitude and Longitude
- Complete all questions.

## *Week 2*

### **February 6:** Lab 1- Vertical Structure of the Atmosphere

- Our first lab looks at some of the gases that make up our atmosphere and introduces the concept of atmospheric pressure. We will construct and interpret a number of graphs to measure how pressure, density, and temperature change with height above Earth's surface. We will focus on how these relationships are expressed in the troposphere, which is where most weather processes occur.
- Complete questions 1-22 in lab manual.
- Refer to Chapter 1 in lecture textbook.

## *Week 3*

### **February 13:** Lab 2 – Earth-Sun Geometry

- What causes the seasons and changes in the amount of daylight we receive? The diagrams and exercises in this lab show how Earth–Sun geometry influences these variables. We examine the Earth–Sun relationship early in our study of weather and climate because most atmospheric processes are ultimately driven by spatial variations in solar energy.
- Complete questions 1-6, 9-12, 17 in lab manual.
- Refer to Chapter 2 in lecture textbook.

## *Week 4*

### **February 20:**

#### Lab 3 - Surface Energy Budget

- This lab introduces you to radiation laws and to the fluxes of radiation as well as other energy forms at Earth's surface. You will study how seasonal, diurnal, and meteorological factors influence these energy exchanges using values measured in the real world.
- Complete questions 1-4, 11-15 in lab manual.
- Refer to Chapters 3-4 in lecture textbook.

#### Lab 4 - Global Energy Budget

- In Lab 3 we examined energy fluxes at a local scale; here we will consider the global energy budget, especially the differences in energy from place to place, as it is those differences that drive most atmospheric processes.
- Complete questions 1-5, 11-15 in lab manual.
- Refer to Chapters 3-4 in lecture textbook.

## *Week 5*

### **February 27:** Lab 5 - Atmospheric Moisture

- What is humidity and how is it important to atmospheric processes? This lab shows how we measure atmospheric moisture and uses two experiments to illustrate its role in energy transfer.
- Complete questions 10-29 in lab manual.

- Refer to Chapter 4 in lecture textbook.

### *Week 6*

#### **March 5:** Lab 6 - Saturation and Atmospheric Stability

- How do clouds form? The concept of saturation, introduced in the previous lab, is important here. The two basic means by which air achieves saturation (relative humidity = 100%) are cooling and increasing water vapor content. In this lab we will examine several common atmospheric processes that will lead to either or both of these phenomena. We will focus particularly on how air changes as it rises from Earth's surface and how these changes relate to atmospheric stability.
- Complete questions 1-16, 18-25 in lab manual.
- Refer to Chapter 4 in lecture textbook.

### *Week 7*

#### **March 12:** Lab 9 - Weather Map Analysis

- With a few exceptions (e.g., clouds), most atmospheric processes are invisible. How then do we "see" the weather in order to forecast its changes? The purpose of this lab is to learn how to construct and interpret weather maps. We will focus on the mid-latitudes, where identification of air masses, fronts, and mid-latitude cyclones can help meteorologists forecast changing weather patterns.
- Complete questions 1-3, 5, 8 in lab manual.
- Complete hand out (Question #9)
- Refer to Chapters 8-9 in lecture textbook.

### *Week 8*

#### **March 19:** Lab 10 - Mid-latitude Cyclones

- How do mid-latitude cyclones form and mature and how do these low-pressure cells affect the weather? This lab uses idealized and real-world examples to illustrate the surface weather patterns associated with mid-latitude cyclones. It also examines how winds above Earth's surface influence storm processes, development, and movement.
- Complete questions 1-17 in lab manual.
- Refer to Chapter 9 in lecture textbook.

### *Week 9*

#### **March 26:** Lab 12 - Thunderstorms and Tornadoes

- What causes thunderstorms and tornadoes? These dramatic events develop when warm, moist air is forced to rise in an unstable atmosphere. Thunderstorms are often categorized as air mass thunderstorms or severe thunderstorms. The distinction recognizes that some develop within a warm, moist air mass, whereas others require strong vertical wind shear. We will focus on the geographic patterns of these storms, their structure, and the atmospheric conditions that produce them.
- Complete questions 1-17 in lab manual.
- Refer to Chapter 10 in lecture textbook.

### *Week 10*

#### **April 2:** Lab 13 – Hurricanes

- Tropical cyclones are violent storms characterized by a low-pressure center, high winds, heavy rain, and rough seas. They form over tropical oceans and are fueled by the evaporation of warm water and the conversion of thermal energy into kinetic energy. Those that form in the Atlantic and eastern Pacific are commonly called hurricanes.
- Complete questions 1-17 in lab manual.

- Refer to Chapter 11 in lecture textbook.

*Week 11*

**April 9:** Lab 14 - Climate Controls

- What causes predictable patterns in temperature and precipitation? Climate is a statistical summary of atmospheric processes for an extended period of time. Viewed broadly, climate results from the physical interaction between Earth's atmosphere, water bodies, ice cover, and land surface. This lab examines seasonal temperature and precipitation patterns with respect to the physical controls causing them.
- Complete questions 1-22 in lab manual.
- Refer to Chapter 15 in lecture textbook.

*Week 12*

**April 16:** Lab 16 – Climate Variability and Change

- Is our climate changing? How can we tell? This lab examines some of the natural factors that have influenced past climate variability and change. Because some causes of change act across long time scales, extending beyond written records, scientists have developed proxy methods to determine the climate of the distant past. The lab presents data from these investigations and lets you explore links between the evidence of change and its potential causes.
- Complete questions 1-23 in lab manual.
- Refer to Chapter 14 in lecture in textbook.

*Week 13*

**April 23: NO CLASS (SPRING RECESS)**

*Week 14*

**April 30: NO CLASS (SPRING RECESS)**

*Week 15*

**May 7:** Lab 17 - Simulating Climate Change

- Few weather and climate topics currently generate more political debate than the issue of human-induced, or anthropogenic, climate change. In this lab, we explore how human activities have influenced atmospheric greenhouse gas concentrations, and the methods and challenges to linking such concentrations to historic and future climate change.
- Complete questions 1-16 in lab manual.
- Refer to Chapter 14 in lecture textbook.

*Week 16*

**May 14:** Group Activity/Review

*Week 17*

**May 21: NO LAB – FINALS WEEK**

## STATEMENT ON THE USE OF ARTIFICIAL INTELLIGENCE (AI)-BASED TECHNOLOGIES

- Artificial intelligence-based technologies, such as ChatGPT, must not be used to generate responses for your assignments.
- Unauthorized use of artificial intelligence software or word mixing software to complete assignments or disguise plagiarized work is considered unauthorized assistance in this course.
- Use of an AI text generator when an assignment does not explicitly call or allow for it without proper attribution or authorization is plagiarism.

## HUNTER COLLEGE STATEMENT ON ACADEMIC INTEGRITY

Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures. Plagiarism, dishonesty, or cheating in any portion of the work required for this course will be punished to the full extent allowed according to Hunter College regulations.

## ADA POLICY

In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical, and/or Learning) consult the Office of AccessABILITY, located in Room E1214B, to secure necessary academic accommodations. For further information and assistance, please call: (212) 772- 4857 or (212) 650-3230.

## HUNTER COLLEGE POLICY ON SEXUAL MISCONDUCT

In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships.

Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College. a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444). b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123. [Sexual-Misconduct-Policy.pdf \(cuny.edu\)](#)

## SYLLABUS CHANGE POLICY

Except for changes that affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice. All changes will be announced on Blackboard, by email, and/or in class.