

ENVS 26a Weather and Meteorology

Class Meeting Details

Format: This class will be held asynchronously. Therefore, there are no in-person or zoom class meetings.

Professor Contact Details

Name and pronouns: Please call me Professor Warner. I use she/her pronouns.

Email: sallywarner@brandeis.edu

Website: [Brandeis faculty website](#)

Office hours days & time: My summer 2026 virtual office hours are available via [my calendar](#). I aim to provide office hours at a wide variety of times, including evenings, because I know students are located in different time zones. If you are unable to meet with me during available times in my calendar, email me and we can find another time to meet.

Office hours format: During the summer for this asynchronous course, my office hours will be on zoom only. Google Calendar will automatically send you the Zoom link when you [sign up for a time slot](#). If you can't make it to a meeting, please be sure to cancel the booking in your calendar, which will open up the spot for other students.

Contacting me via email and meeting with me outside of my office hours: You can also contact me by email with questions or to schedule a virtual meeting outside of my office hours. I will respond as quickly as possible, at most within 24 hours on weekdays. Weekend emails will have a longer response time.

Course Description

Don't knock the weather; nine-tenths of the people couldn't start a conversation if it didn't change once in a while.

– Kin Hubbard

There's no such thing as bad weather, only different kinds of good weather.

– John Rushkin

I've lived in a good climate, and it bores the hell out of me. I like weather rather than climate.

– John Steinbeck

Weather is something we experience on a daily basis. It can impact our routines and our moods. When the weather is strong, it can cause huge amounts of damage and displace people from their homes. In this course, you will learn the science of meteorology in order to understand the mechanisms within the atmosphere that create weather, and why the weather varies from place to place and from day to day.

Throughout this course, I invite you to spend the summer observing your local weather with an attentive eye. As you learn scientific concepts about the atmosphere, you will have opportunities to connect your scientific understanding to observations of your local weather.

Learning Goals:

By the end of this course, you should be able to:

- Describe the factors that control the distributions of temperature, humidity, pressure, wind, precipitation, clouds and fronts in the atmosphere.
- Explain how meteorological weather data is collected by instruments like weather balloons, weather stations, and satellites. Be able to access both historical weather data and local weather data in real time. Analyze and interpret real meteorological data presented in numerical and graphical formats.
- Understand what drives major weather disturbances like hurricanes, blizzards, tornadoes, lightning and thunder, and strong precipitation.
- Predict and evaluate the consequences of climate change on weather patterns.

Transferable Skills:

Transferable skills are abilities that you will develop in this course that will be useful in future jobs in a wide variety of fields.

- **Observation and data collection:** Throughout the summer, you will observe your local weather carefully and document your observations. This will give you practice with the scientific skills of collecting data and analyzing data in programs like R, python, Excel and/or google sheets. You will work to find correlations between your observations and the data that you collect.
- **Formulate hypotheses:** Throughout the semester, you will get practice formulating hypotheses about why your local weather changes. You will then use observations and data collection to deduce the validity of your hypotheses. The skills of formulating and testing hypotheses will be useful in many other scientific realms.
- **Communicate science clearly:** Scientists need the ability to communicate scientific topics to audiences with a wide range of scientific knowledge. This is particularly important for meteorologists. Not only is weather something that people talk about in their day to day lives, but meteorologists need to be able to communicate the severity and risk of impending weather disasters to help residents prepare.

Fulfilling learning goals of the Environmental Studies Program

The Environmental Studies Program has numerous learning goals that we would like our students to achieve through our major and minors. Specifically in this course,

- we will work on developing all three core skills: (1) communication skills, (2) quantitative skills, and (3) critical thinking skills;
- we will increase knowledge by learning about meteorology and climate change.

Quantitative Reasoning

This course is designated to fulfill the quantitative reasoning foundational literacy for the Brandeis Core. As such, it incorporates multiple assignments designed to help you develop quantitative skills like solving problem sets based on meteorological phenomena, statistical analysis of weather data, learning to read weather maps, and creating graphs and plots that depict weather data.

Teaching/learning strategies

Given that there are no synchronous meetings of this course, it will be up to you to make sure that you're staying on top of the assigned work and meeting deadlines. All expectations and deadlines will be clearly indicated via the course moodle page.

Credit Hours:

The Department of Education's standard states that the combined total of class related engagement must equal 18 hours per week for a ten-week, four-credit summer course.

Prerequisites

It is recommended that you have the ability to do math calculations at a level that includes algebra and trigonometry. It is also recommended that you have taken physics at the high school level. *If you are worried about the pre-requisites, please email me or schedule a meeting with me so we can discuss your specific situation.*

Course Materials

Textbook

We will be using a free, online, interactive meteorology textbook for this course.

- Seman, Steven. **METEO 3: Introductory Meteorology**. Department of Meteorology and Atmospheric Science, College of Earth and Mineral Sciences, The Pennsylvania State University. <https://www.e-education.psu.edu/meteo3/>. Available via a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

This textbook was created for the METEO 3 course at Penn State University. You do not need to register for the METEO 3 course on their website. We're simply using their freely-available textbook.

Book for general audiences

In addition to the textbook, we will also read the following book that describes historical weather events that have impacted New England. This book is available in print form, as an ebook, or as an audiobook. Prices vary depending on format. **Purchasing this book is required.**

- Fisher, Eric P. [*The Mighty Storms of New England: The hurricanes, tornadoes, blizzards, and floods that shaped the region*](#). 2021. Guilford, Connecticut: Globe Pequot. 2021. ISBN: 9781493043507.

Laptops and computers

Given that this is a remote course, you will need a laptop or computer that has reliable internet access in order to complete the coursework.

Help with the costs of course materials

If you have difficulty purchasing course materials, please make an appointment with your Student Financial Services or Academic Services advisor to discuss possible funding options and alternative solutions.

Components of Course Work

Success in this course depends on the following components, which are described in detail below:

Participation & Attendance

Given that this is an asynchronous online course, participation and attendance will not be a big component of the course. I will require two one-on-one zoom meetings, so we can get to know each other a bit and so we can discuss your final project. Attendance at these meetings will be incorporated into your final project grade.

Discussion posts

Every week, you will write a discussion post and comment on your classmates' discussion posts. Some discussion posts will be about observations of your local weather, some will be about the book *The Mighty Storms of New England*, and some will be based on the textbook reading. Specific prompts for each week will be provided. You will comment on at least two of your classmates' posts as a way to spark discussion of the material.

Reading quizzes

Each week, you will read two chapters in the [METEO 3: Introduction to Meteorology](#) textbook. After completing the readings, you will take a multiple-choice reading quiz, which will help to reinforce the ideas discussed in each chapter.

Quantitative assignments

You will complete weekly problem-solving assignments. Through the assignments, you will show your understanding of the course material by applying it to solve quantitative problems about the atmosphere, meteorology and weather. Many questions in the quantitative assignments will require you to do calculations and interpret data from graphs or diagrams. Specifically, it's important that you become skilled at understand atmospheric weather maps.

Final project

Some key goals of this course are for you to get practice making scientific observations, and for you to know where to access local real-time weather data and historical weather data. To achieve these goals, you will work on a multi-part final project focused on your local weather. Throughout the summer you will use your camera to document various weather phenomena, and you will simultaneously collect data from local weather stations, radar and satellites.

Various parts of the final project will be due on a regular basis throughout the summer. Then, at the end of the summer, you will write a project report that synthesizes your observations and analysis and communicates this information in a clear and accessible way. Full details about this project will be given near the start of the semester.

Evaluation and Grading

Your grades for discussion posts, quantitative assignments, and the final project will all be posted to the moodle gradebook.

Course Element	Grade %	Learning goals and skills that you will gain
Discussion posts	15%	<ul style="list-style-type: none"> - Organize and communicate your thoughts about a particular topic related to the course - Engage with your peers in this class
Reading quizzes	15%	<ul style="list-style-type: none"> - Reinforce the content that was presented in the weekly textbook readings - Check your understanding of the material from the textbook
Quantitative assignments	30%	<ul style="list-style-type: none"> - Apply the concepts learned from the textbook towards solving quantitative meteorological problems
Final Project	40%	<ul style="list-style-type: none"> - Make observations of your local weather - Access real time weather data from weather stations, radar and satellites - Access historical weather data - Analyze meteorological data - Present your quantitative analysis in an organized report

Late submission policy

The deadlines for all assigned work will be made clear on moodle. The following late policy applies:

Late submission policy: I have two categories for submitting work late:

- (1) **“No excuse needed” category:** I will accept late submissions. You will lose 10% of the maximum value for each day that your work is late (i.e. 1-24 hours late loses 10%, 25-48 hours late loses 20%, and 49-72 hours late loses 30%, etc.). You do not need to give me an excuse to submit late work in this category. It’s up to you to decide if it’s worth it to lose the points for submitting a late assignment — sometimes the extra time will allow you to learn more and receive a better grade.
- (2) **“Severe hardship” category:** If you cannot submit your assignment on time because you have experienced a severe hardship that’s out of your control, please email me *before the due date* to discuss options for extensions.

Converting percentages to course letter grades

I will use the following conversions to assign letter grades based on the course averages.

> 95%	A	87-89.9%	B+	77-79.9%	C+	67-69.9%	D+
90-94.9%	A-	83-86.9%	B	73-76.9%	C	63-66.9%	D
		80-82.9%	B-	70-72.9%	C-	60-62.9%	D-
						<60%	E (F)

Important Course Policies

Communication

Everything you’ll need to know for this course will be posted on the course moodle page. This will include all readings, assignments, discussion posts, and final project prompts.

I will communicate important course updates through the moodle message posts, which automatically get sent to your Brandeis email. Please be sure to regularly check your Brandeis email in a timely manner throughout the summer.

Accommodations and Student Support

Brandeis seeks to create a learning environment that is welcoming and inclusive of all students, and I want to support you in your learning. If you think you may require disability accommodations, you will need to work with Student Accessibility Support (SAS). You can contact them at 781-736-3470, email them at access@brandeis.edu, or visit the [Student Accessibility Support home page](#). You can find helpful student FAQs and other resources on the SAS website, including guidance on how to know whether you might be eligible for support from SAS.

If you already have an accommodation letter from SAS, please provide me with a copy as soon as you can so that I can ensure effective implementation of accommodations for this class. In order to coordinate exam accommodations, ideally you should provide the accommodation letter at least 48 hours before an exam.

Academic Honesty

You are expected to be familiar with, and to follow, the University’s policies on academic integrity. You are expected to be honest in all of your academic work. Please consult [Brandeis University Rights and Responsibilities](#) for all policies and procedures related to academic integrity. Allegations of alleged academic dishonesty will be forwarded to Student Rights and Community Standards. Sanctions for academic dishonesty can include failing grades and/or suspension from the university. [Citation and research assistance](#) can be found on the [university library website](#).

If you have any questions, please contact Alex Rosett (arossett@brandeis.edu), Assistant Dean, Student Rights and Community Standards.

Generative AI

The use of generative AI tools on discussion posts, quantitative assignments, and the final project is strongly discouraged. If you use a generative AI tool, you must cite it as a reference. You are the one ultimately responsible for the content of your submitted work, therefore, it is your responsibility to cross-check generative AI to determine its accuracy and correctness. Final projects that appear to be “AI slop” and don’t contain critical thinking and analysis will receive very poor grades.

Library

The Brandeis Library collections and staff offer resources and services to support Brandeis students, faculty and staff. These include workshops, consultations, collaboration, materials and instruction on emerging trends in technologies such as machine learning, emerging trends in research such as data visualization, and emerging trends in scholarship such as open access. Librarians at the Circulation Desk, Research Help Desk, Archives & Special Collections, Sound & Image Media Studios, MakerLab, AutomationLab, and Digital Scholarship Lab are available to help you.

<https://www.brandeis.edu/library/about/index.html>

Respectful Learning Environment

Brandeis University is committed to providing its students, faculty and staff with an environment conducive to learning and working, where all people are treated with respect and dignity. Please refrain from any behavior toward members of our Brandeis community, including students, faculty, staff, and guests, that intimidates, threatens, harasses, or bullies. Please consult [Brandeis University Rights and Responsibilities](#) for all policies and practices related to respectful environment.

Course Plan

Please note that this course plan is subject to change. The course moodle page will contain finalized information about each day’s topics, assigned readings, and other due dates.

- Week 1
 - Introduction to the course
 - Lesson 1: A Meteorologist’s Toolbox
 - DUE: Reading quiz #1: synthesizes the syllabus and lesson 1
 - DUE: Quantitative assignment #1: Apply the skills you learned in lesson 1
 - DUE: Discussion post introducing yourself to the class
- Week 2
 - Lesson 2: The Global Ledger of Heat Energy
 - Lesson 3: Global and Local Controllers of Temperature
 - DUE: Reading quiz #2: synthesizes lessons 2 & 3
 - DUE: Quantitative assignment #2: Apply the skills you learned in lessons 2 & 3
 - DUE: Discussion post about a weather observation that you made this week
- Week 3
 - Lesson 4: The Role of Water in Weather
 - Lesson 5: Remote Sensing of the Atmosphere
 - DUE: Reading quiz #3: synthesizes lessons 4 & 5
 - DUE: Quantitative assignment #3: Apply the skills you learned in lessons 4 & 5

- DUE: Discussion post about *The Mighty Storms of New England* Part One: Winter in New England
- Week 4
 - Lesson 6: Surface Patterns of Pressure and Wind
 - Lesson 7: Mid-Latitude Weather Systems
 - DUE: Reading quiz #4: synthesizes lessons 6 & 7
 - DUE: Quantitative assignment #4: Apply the skills you learned in lessons 6 & 7
 - DUE: Discussion post about *The Mighty Storms of New England* Part Two: Summer in New England
- Week 5
 - Lesson 8: The Role of Stability in Thunderstorm Formation
 - Lesson 9: Severe Weather
 - DUE: Reading quiz #5: synthesizes lessons 8 & 9
 - DUE: Quantitative assignment #5: Apply the skills you learned in lessons 8 & 9
 - DUE: Discussion post about *The Mighty Storms of New England* Part Three: Major Hurricanes in New England
- Week 6
 - Lesson 10: The Human Impact on Weather and Climate
 - DUE: Reading quiz #6: synthesizes lesson 10
 - DUE: Quantitative assignment #6: Apply the skills you learned in lesson 10
 - DUE: Discussion post about *The Mighty Storms of New England* Part Four: Power of Water — Major Floods
 - DUE: Final project part 1
- Week 7
 - Lesson 11: Patterns of Wind, Water, and Weather in the Tropics
 - Lesson 12: Hurricanes
 - DUE: Reading quiz #7: synthesizes lessons 11 & 12
 - DUE: Quantitative assignment #7: Apply the skills you learned in lessons 11 & 12
 - DUE: Discussion post about the historical weather of your region
- Week 8
 - Lesson 13: Becoming a Savvy Weather Consumer
 - DUE: Reading quiz #8: synthesizes lesson 13
 - DUE: Quantitative assignment #8: Apply the skills you learned in lesson 13
 - DUE: Discussion post about *The Mighty Storms of New England* Part Five: Tornadoes: An Infrequent but Destructive Menace
 - DUE: Final project part 2
- Week 9
 - DUE: Discussion post about *The Mighty Storms of New England* Part Six: Ocean Storms
 - DUE: Final project part 3
- Week 10
 - Wrap up course
 - DUE: Final project part 4