

# Introduction to Meteorology

## 11:670:101 Section 01 - Fall 2022

Rutgers University  
School of Environmental and Biological Sciences  
Department of Environmental Science

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### Course Description

This course provides an overview of current weather maps; the structure of the atmosphere; the role of moisture in the development of dew, clouds, and precipitation; air masses, fronts, cyclones, thunderstorms, tornadoes, and hurricanes; and elements of weather forecasting, instrumentation and communication.

- Prerequisites: None
- Credits: 3 hours
- Satisfies: SAS Natural Sciences [NS] and Information Technology and Research [ITR] requirements, and the SEBS Natural Sciences [NS - Physical] and Information Technology and Research [ITR] requirements.

### Course Meeting Times, Contact Information

Class meetings will be held on Thursdays in the Cook/Douglass Lecture Hall (Room 102) from 5:40 pm to 8:40 pm. Each class will begin with a real-time weather discussion to reinforce key concepts followed by mixture of traditional lectures and in-class discussions. Ample time will be given for students to ask questions and explore concepts in more depth. The in-person class meeting will adhere to [Rutgers policies related to COVID-19](#).

Please contact the instructor through this canvas site or via email at [John.Krasting@rutgers.edu](mailto:John.Krasting@rutgers.edu). **Office hours are virtual and by appointment only.**

### Course Learning Goals

Upon completion of the course, students will be able to:

1. Exhibit critical thinking when confronting new information
2. Interpret basic weather forecasts as presented on television/radio/Internet
3. Explain basic atmospheric phenomena from a physical perspective
4. Apply the physical foundations of meteorology to solve problems using analytical methods
5. Know whether they might enjoy pursuing further study in the atmospheric sciences

This course also satisfies these SAS Core Curriculum Learning Goals:

## II: Areas of Inquiry

### A: Natural Sciences

- (e) Understand and apply basic principles and concepts in the physical and biological sciences.
- (f) Explain and be able to assess the relationship among assumptions, method, evidence, arguments, and theory in scientific analysis.
- (z) ITR (technology)

## Prerequisites:

### Coursework and Skills

There are no academic prerequisites, although a college level proficiency with algebra is suggested for portions of this course. A casual knowledge of basic weather and curiosity about the natural world are beneficial. This introductory course provides a broad foundation for those pursuing meteorology, atmospheric science, or climate degrees but is also accessible to those seeking to enroll in a general college level science course.

### Internet Connectivity

It is necessary to have internet connectivity, access to the Rutgers Canvas Website and Zoom Videoconferencing Software to participate in this course. Interruptions in connectivity that hinder your performance in this course should be reported to the instructor immediately once connectivity is restored.

Please be mindful that students in the class come from a variety of backgrounds and situations. Please refrain from distracting backgrounds and inappropriate venues or attire while participating in video conferences.

## Learning Resources

## **Required Textbook:**

[Ahrens, D.C. Essentials of Meteorology : An Invitation to the Atmosphere - 7<sup>th</sup> edition.](#) (Both older and newer editions may vary slightly. Study guide not required.) Completing the reading assignments is essential to performing well in this course. There will be a reading assignment for each lecture that must be completed prior to coming to class.

## **Webpage:**

Canvas will be used for the course website. From Canvas you can obtain Exam grades, resources, announcements, etc. <https://canvas.rutgers.edu/>

## **Class Meetings:**

Each class meeting will begin with a weather discussion based on real-time observations, satellite, radar, and computer model data. The weather discussions are intended to show how the concepts taught in the course play out in the real world. The discussions are an opportunity to talk about current weather events and show how meteorology impacts the natural world and human society.

The format of the lectures will be open and students are highly encouraged to think critically about the course material, ask questions, share their thoughts and opinions, and participate in discussions.

## **Extra Assistance:**

Students may arrange office hours with the instructor by request. Students may also form study groups and are encouraged to study together.

## **How You Will Be Evaluated**

### **Exams:**

There will be three (3) non-cumulative hourly exams, contributing 80% to your total course average. The exams will be based on the materials presented in the lectures and in the course textbook.

The exams will be multiple-choice format. Students are required to have a calculator for the exams, but “smart phones” are strictly prohibited. The exams will be conducted in-person, subject to the current Rutgers COVID-19 policies.

**There are no make-up or rescheduled exams.** Exam conflicts must be discussed with the instructor at least two weeks prior to the scheduled exam in order to make alternative arrangements.

**Quizzes:**

Throughout the semester there will be 10-question quizzes based on the reading and lecture material that will account for 20% of your course grade. The quizzes will be administered through the Canvas system. *The lowest quiz grade, including a zero, will be dropped.*

**Homework:**

There are no graded homework assignments for the course, but additional learning outside of the classroom is expected. It will be difficult to perform well on the exams without additional preparation and review of the course materials. Students should be able to answer the study questions at the end of each chapter in the text. Any questions that are too difficult can be discussed in office hours or over email.

**Extra Credit:**

There are no extra credit assignments available for this course. However, there will be several opportunities during lecture to earn extra credit points that will be applied to the exams.

**Course Grade Breakdown**

	Weighting Value
Exam 1	26.67%
Exam 2	26.67%
Exam 3	26.67%
Quizzes	20%
COURSE TOTAL	100%

**Grading Scale**

This course will follow the standard Rutgers grading scale:

A	>= 90
B+	85-89
B	80-84
C+	75-79
C	70-74
D	60-69
F	Below 60

## Course Policies

### Classroom Courtesy

You are expected to be respectful of fellow students and me. Examples of courtesy include:

- Making every effort to attend lectures
- Doing the reading assignments ahead of time
- Coming to class prepared to discuss the materials

### Academic Integrity:

The University policy about academic integrity can be found at website <http://academicintegrity.rutgers.edu/>. Academic dishonesty in this course is not acceptable.

### Special Needs:

To ensure that disability-related concerns are properly addressed from the beginning, students with disabilities who require reasonable accommodations to participate in this class are asked to see the instructor as soon as possible with the appropriate documentation. For more information, contact the [Rutgers Office of Disability Services](#).

### Masking, Vaccine, and Social Distancing Policy:

Rutgers requires that all students be vaccinated for COVID-19 and upload proof of vaccination to the University. Masks are required to be worn inside all Rutgers facilities regardless of vaccination status. This is a large lecture course and it is especially important for the health and safety of everyone that we adhere to these policies.

## Frequently Asked Questions

*What if I or a close family member/relative becomes ill?*

Please contact the instructor as soon as possible to discuss your situation if your absence will impact your ability to complete a graded assignment. It is the default policy that no make-up exams will be given (see above). Accommodations will be considered if effort is made to contact the instructor as soon as an issue arises, however the *final discretion on all matters lies with the instructor*.

*What if class is canceled due to a closure at the University?*

In the event that the university closes on the account of unforeseen circumstances, guidance provided from the University will be followed. Every effort will be made to reschedule course meetings where appropriate.

*It's the end of the semester and I want to boost my grade. Can I do extra credit?*

Opportunities will be given throughout the semester to obtain extra credit. These opportunities typically amount to a few extra points on each of the hourly exams. Aside from this, however, there are no other extra credit assignments.

## Course Calendar & Reading Schedule

## Introduction to Meteorology (11:670:101 Section 01)

### *Fall 2022 Class Schedule & Reading Calendar*

Date	Lecture	Reading Assignment
Thu. Sep 8	<i>Course Introduction</i> Lecture 1: Atmospheric Structure	Ch. 1
Thu. Sep 15	Lecture 2: Radiation Balance and Temperature	Ch. 2
Thu. Sep 22	Lecture 3: Humidity and Atmospheric Stability	Ch. 3 & 4
Thu. Sep 29	Lecture 4: Clouds and Precipitation	Ch. 5
Thu. Oct 6	<b>No Class</b>	
<b>Thu. Oct 13</b>	Lecture 5: Atmospheric Pressure <b>Exam 1 (Covers Lectures 1-4; Chapters 1-5)</b>	Ch. 6
Thu. Oct 20	Lecture 6: Scales of Motion & Circulation	Ch. 7
Thu. Oct 27	Lecture 7: Air masses, Fronts, and Cyclones	Ch. 8
Thu. Nov 3	Lecture 8: Forecasting	Ch. 9
<b>Thu. Nov 10</b>	Lecture 9: Thunderstorms and Tornadoes <b>Exam 2 (Covers Lectures 5-8; Chapters 6-9)</b>	Ch. 10
Thu. Nov 17	Lecture 10: Hurricanes	Ch. 11
Tue. Nov 22	<b>(Zoom)</b> Lecture 11: Air Pollution & Atmospheric Optics <i>Carrers in Meteorology Discussion</i>	Ch. 14 & 15
Thu. Dec 1	Lecture 12: Climate Change	Ch. 12 & 13
<b>Thu. Dec 8</b>	<b>Exam 3 (Covers Lectures 9-12, Chapters 10-15)</b>	