

# Introduction to Climate Science (11:670:102)

This course provides an introduction to the climate system. Topics addressed include the major mechanisms influencing climate, including Earth's energy balance, water cycle, and atmospheric circulation; spatial distribution of climate and climate classification; natural climate variability, including El Niño; past climate variations; and the carbon cycle and human-induced climate change.

## Learning Goals

- (1) Understand and apply basic concepts in climate science.
- (2) Analyze the relationship that science and technology have to the social and policy dimensions of global climate change.

## Textbook

None

## Meeting Times

Mondays and Thursdays, from 12:10-1:30 PM, Eastern time.

## Instructor contact information

Dr. James Shope

email: [jbs284@envsci.rutgers.edu](mailto:jbs284@envsci.rutgers.edu)

Office: ENR 358

Office Hours: by appointment

## Technology Requirements

Should any health concerns require a temporary switch to remote teaching, this course will meet synchronously, with meetings held during the regular class periods. In order to attend this course during that time, you will need an internet/wifi connected device (e.g., computer, tablet, smartphone) with a camera. The device must be able to access Canvas and to run Zoom. All students are expected to attend synchronous sessions with their cameras on and to actively participate in group discussions and activities.

## Grading

- |                           |     |
|---------------------------|-----|
| 1. Quizzes (5)            | 50% |
| 2. In-class exercises (5) | 50% |

## Class Attendance

Attendance is not taken in this class, but the class is not too large to notice whether or not you attend. In borderline cases, students who demonstrate that they are trying their best by attending class regularly may be graded more generously.

## Academic Integrity

Students are expected to understand and to act in accordance with the Rutgers Academic Integrity Policy:

<http://nbacademicintegrity.rutgers.edu/home/academic-integrity-policy/> (Links to an external site.)

Violations include: cheating, fabrication, plagiarism, denying others access to information or material, having someone else complete your course work, and facilitating violations of academic integrity by others.

Resources for students: <http://nbacademicintegrity.rutgers.edu/home/for-students/> (Links to an external site.)

### Weekly Class Schedule

Modules in Canvas will be used to organize our weekly class materials. Lecture slides and other materials will be posted in the Module for that week after class.

Date	Topic
Week 1 1/18	Course overview; What is climate and how do we observe it?
Week 2 1/22 1/25	Scientific methods; Tools for studying climate: Physics, units, and statistics Composition and structure of the atmosphere
Week 3 1/29 2/1	Other climate system components: Ocean, ice, and land <b>Quiz (2/1)</b>
Week 3 2/5 2/8	Electromagnetic radiation <b>In-class exercise: Climate statistics (2/8)</b>
Week 4 2/12 2/15	Earth's energy balance Atmospheric circulation
Week 5 2/19 2/22	Earth's water cycle <b>Quiz (2/22)</b>
Week 6 2/26 2/29	Why do different places have different climates? Global climate patterns
Week 7 3/4 3/7	Natural climate variability: El Niño and the Southern Oscillation <b>In-class exercise: Climates of the U.S. (3/7)</b>
Week 8 3/11 3/14	<b>Spring Break</b>
Week 9 3/18	Natural climate variability: Other patterns of climate variability

3/21	<b>Quiz (3/21)</b>
Week 10 3/25 3/28	How climate can change: Forcing, feedback, and sensitivity <b>In-class exercise: El Niño (3/28)</b>
Week 11 4/1 4/4	Documenting past climate: Modern observations and natural archives Climates of the last millennium
Week 12 4/8 4/11	Climates of the more distant past: Warm and cold <b>In-class exercise: Past climate (4/11)</b>
Week 13 4/15 4/18	Human influences on the carbon cycle and climate <b>Quiz (4/18)</b>
Week 14 4/22 4/25	Tools for projecting future climate change <b>Online exercise: Climate change according to ChatGPT</b> Projections of future climate: Global responses and extreme events
Finals 5/2	<b>Quiz (12-3 PM)</b>

**Note:** Except for the dates of quizzes, this schedule may change slightly. Adjustments may be made based on our rate of progress through the material or if any classes are cancelled as a result of unforeseen circumstances.

### **Assertion of Intellectual Property Rights**

Lectures and materials utilized in this course, including but not limited to videos, podcasts, visual presentations, assessments, and assignments, are protected by United States copyright laws as well as Rutgers University policy. As the instructor of this course, I possess sole copyright ownership. You are permitted to take notes for personal use or to provide to a classmate also currently enrolled in this course. Under no other circumstances is distribution of recorded or written materials associated with this course permitted to any internet site or similar information-sharing platform without our express written consent. Doing so is a violation of the university's [Academic Integrity Policy \(Links to an external site.\)](#).

### **Anti-Discrimination and Student Wellness Links**

**Bias Incident Reporting and Support (DICE)** <https://diversity.rutgers.edu> (Links to an external site.)

The Division of Diversity, Inclusion, and Community Engagement works to advance, promote and advocate for inclusiveness, diversity, and equity at Rutgers University.

If you believe you are the victim of or a witness to an alleged bias incident, you may report the incident, in person or by phone, to the Dean of Students Office, Residence Life staff, or another member of the Student Affairs staff <https://studentaffairs.rutgers.edu/> (Links to an external site.). Individuals may also report an alleged bias incident online:

<https://studentaffairs.rutgers.edu/resources/bias-prevention/bias-incident-reporting> (Links to an external site.)

### **Counseling, ADAP & Psychiatric Services (CAPS)**

**(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/**

**<http://health.rutgers.edu/medical-counseling-services/counseling/>** (Links to an external site.)

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

**Crisis Intervention:** <https://health.rutgers.edu/medical-and-counseling-services/counseling-services/crisis-intervention>

**Report a Concern:** <http://health.rutgers.edu/do-something-to-help/> (Links to an external site.)

### **Violence Prevention & Victim Assistance (VPVA)**

**(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 /**

**<https://www.vpva.rutgers.edu>**

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

### **Disability Services**

**(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>** (Links to an external site.)

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation. The documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://webapps.rutgers.edu/student-ods/forms/registration> (Links to an external site.)

**Reporting of sexual harassment, sexual assault, dating or domestic violence, and/or stalking:** Reports of sexual harassment, sexual assault, dating or domestic violence, and/or stalking may be made using any of the following options:

1. Report to a Title IX Coordinator directly (a list of each campus's Title IX Coordinator is provided below). Such a report may be made at any time (including during non-business hours) via telephone or email, or by mail to the address listed for the Title IX Coordinator.
2. Report online, using the reporting [form \(Links to an external site.\)](#) posted here. Individuals may also report crimes of sexual violence to the [Rutgers University Police Department \(Links to an external site.\)](#).