Bergen Community College
Division of Mathematics, Science and Technology
Department of Physical Sciences

Course Syllabus
PHY 112 - Climatology

Meeting Time and Location

Semester and year:
Course Number:
Meeting Times and Locations:

Instructor:
Office Location:
Phone:
Office Hours:
Email Address:

Course Title: PHY112 Climatology

Prerequisites: None

Course Description:

Climatology is a study of the Earth's climate. Climate elements and atmospheric heat transfer processes will be studied and applied to climate classification schemes. The effects of climate on human activities will be considered. Special attention will be given to the greenhouse effect, El Nino, Ice Age theories, climatic explanation for the extinction of the dinosaurs, and past and future climates. Laboratory work features simple analytical and statistical analysis of climate data.

Credit: 4 credit General Education Course (3 hours lecture, 3 hours laboratory).

Student Learning Outcomes

By completing this course, the student will be able to:

1. Demonstrate that climate is the result of mass and energy accumulations over time, and identify processes that affect mass and energy accumulations, including changes in solar output, changes in Earth's albedo, or changes in the concentration of atmospheric greenhouse gases.
2. Evaluate the strengths and weaknesses of different tools used to evaluate Earth's climate such as climate models and climate observations and be able to justify which tool or tools to use for a given hypothesis.
3. Interpret how the carbon and hydrologic cycles impact Earth's climate.
4. Illustrate a timeline of Earth's climate history, and provide evidence of past climate change by identifying and interpreting proxy records.
5. Explain the primary consequences of climate change for water and food supplies, coastal damages, relocation costs, energy consumption, and economic growth; strategies for minimizing the effects of climate change and for adapting to a changing climate.
6. Identify the natural causes of climate change, and distinguish how these causes differ from anthropogenic causes of climate change.

Means of Assessment:

Students in this course will:

1. Demonstrate understanding of climatological concepts by completing short weekly reading assignments and quizzes.

2. Complete weekly laboratory activities by analyzing real climatological data by running climate models and using software tools such as Google Earth.

4. Participate actively in class discussions about climatological concepts and key themes.

5. Create a Capstone Project by choosing several places on Earth experiencing climate change and creating a virtual tour indicating the climactic impacts and possible solutions for each location.

6. Present the Capstone Project tour to their classmates.

Grading:

There are 12 modules in this course. Your final grade will be based solely on the work you have done in meeting the requirements for the course. If you have any questions or concerns about your grade, please talk to the instructor right away. The end of the semester is too late to address concerns.

The grading scheme for this course is based on a 1,000 point grading system. This makes it easy for you to determine your grade at any point in the course. Hopefully, this will incentivize you to strive for extra points or put in some extra effort on assignments.

Category	Weight (Percentage)	Number of Points Available for Each Category	Value of Each Item
Readings	12	120	12 reading assignments at 10 points each
Quizzes	24	240	12 quizzes at 20 points each
Laboratory Activities	35	350	14 labs at 25 points each
Discussion Forum Participation	12	120	12 discussion folders for 10 points each
Capstone Project	17	170	6 assignments at 20 points each, 1 video for 50 points
Total	100	1000	

Total Points	Final Grade
900 - 1000	A
870 - 899	B+
800 - 869	B
770 - 799	C+

700 - 769	C
600 - 699	D
0 - 599	F

However, please note: In order to pass this course, the student must complete and hand in at least 70% of the lab assignments regardless of the (possibly high) quality of the test grades.

Textbooks:

The lecture material will be provided by the instructor.

Laboratory Manual:

The laboratory guides and supplemental materials will be provided by the instructor.

Course Content

Reading Assignments:

There will be 12 reading assignments - one for each module. There are questions embedded in each reading assignment mostly consisting of multiple-choice and true/false questions. They are designed so that you can check your understanding of the material in each reading. You may answer them as many times as you need to. My thinking behind this is that the reading assignments should be a low-pressure activity. You can access the reading assignments as many times as you need to. You will not be timed, but you must read and answer all of the questions by the due date. If the due date has passed, points will not be awarded for that particular assignment.

Activities/Labs:

For each module, we will do at least one activity/lab which will either be submitted as a Moodle quiz or downloaded and submitted as a PDF.

Capstone Project:

The goal of the capstone is for you to summarize your learning by reading one of two possible reports on the impacts of climate change on the US and the world. This exercise will require you to produce short video clips that relate to what you have learned. The videos need to report on the impact of various aspects of climate and environmental change in specific places.

Discussions and Participation:

All discussions will be held on Moodle. If you have a question about a topic, lesson, lab, activity, or anything else non-personal, it should go on the respective Moodle forum (rather than be emailed to me).

I will sometimes assign a particular discussion assignment, but generally, the discussion for each module will focus on the material for that particular module, but other than that, you have great freedom on what to post. You can post a question (or several) about something you didn't quite understand, something you found interesting, a personal experience you may have had about the topic, something you agree or disagree with, etc. To earn full credit, you should plan on posting at least once for each module and respond to at least two of your fellow students' posts. You can even earn extra credit points toward your final grade by making a great post or answer, or using multimedia to support your post or an answer to another student's question!

Due Dates

All assignments (activities, homework, labs, etc.) are due at one week after they are assigned, unless otherwise specified. There are fairly stiff penalties for lateness: I will accept an assignment (not including discussion posts) up to a week late, with one letter grade off. After that, it will no longer be accepted. Internet connectivity and resolving technical issues are your responsibility and are not valid excuses for lateness. Late discussion posts will receive a grade of 0. All work is expected to be neat and organized. Cross checking and discussion of assignments outside of the classroom is encouraged, but not when it gets to the point of plagiarism. If you are stuck, first post your question on the class forums. Otherwise, please see the instructor during an office hour or by appointment.

Statement on Accommodations:

Accommodations for Disabilities: Bergen Community College aims to create inclusive learning environments where all students have maximum opportunities for success. Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Office of Specialized Services at 201-612-5269 or via email at ossinfo@bergen.edu for assistance.

Statement on Academic Integrity

You are encouraged to hold study groups and work together on labs and class activities. However, any work you turn in must be your own. You should not divide up the work so that one student does problems 1-5, the other 6-10, and then copy from each other. Turnitin will be used, and any writing assignment must either be your own words and ideas, or properly attributed. We will discuss how to do this. Any cheating on assignments or exams will be harshly penalized, have severe consequences for your final grade, and a report will be made and filed with the Office of Student Conduct. I take this very seriously. Acts of academic dishonesty are career-ending for a scientist.

The first instance of an assignment that is determined to have been plagiarized in any part will receive a grade of zero with no resubmission allowed and be reported to the Office of Student Life and Judicial Affairs. A second plagiarized assignment will result in an automatic grade of F for the course. These rules hold for online discussions and laboratory submissions, as well.

Faculty Absences:

If I need to miss class, I will make every attempt to inform you ahead of time via email. It is very important that you regularly check your Bergen student email, as that is the only way I have to get in touch with you. A daily listing of canceled classes will be listed at www.bergen.edu/classcancellations.

Student Absences:

You are responsible for the material that you miss. The student must obtain notes and other assignments missed during office hours or by appointment. i.e., class time cannot be taken up to attend to affairs resulting from an individual student's absence.

Schedule of Topics

Week	Topic

1, 2	Course introduction Past episodes of climate change Lab 1: Paleocene-Eocene Thermal Maximum (PETM)
3	Recent Climate Change Lab 2: Hurricanes and Storms Capstone project introduction Capstone Assignment 1
4, 5	Earth's Climate System Lab 3: Sources of Climate Data Lab 4: Climate Modeling
6	Introduction to General Circulation Models (GCMs) Lab 5: IPCC Predictions Capstone Assignment 2
7	Earth's Carbon Cycle Lab 6: The Carbon Cycle Lab 7: Your Own Carbon Footprint
8	Ocean Circulation Lab 8: Ocean Properties and Circulation Lab 9: Global Atmospheric Circulation
9	Ocean Acidification: The "Other" Climate Problem Lab 10: Natural Cycles – El Niño and La Niña Capstone Assignment 3
10	Water Cycle and Water Resources Lab 11: Ocean Acidification and Coral Reefs Capstone Assignment 4
11	Climate Impacts on the Food Supply Lab 12: The Water Cycle and Stream Flow
12, 13	Sea-level Rise Lab 13: Sea-level Rise and Coastal Communities Capstone Assignment 5
14	Terrestrial Ecosystems Capstone Assignment 6
15	Adaptation and Mitigation Lab 14: Options for the Future Capstone Assignment Conclusion