

Stony Brook University
School of Marine & Atmospheric Sciences (SoMAS)
MAR 527
Global Change

Course Instructor: Mary Scranton, Professor, SoMAS

Instructor contact information:

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Course Description: The course examines the scientific basis behind questions of global change and some of the policy implications of changes to the region and country. Topics include evidence and courses of past climactic changes, greenhouse gases and the greenhouse effect, analogues with other planets, the Gaia hypothesis, climate modeling, and deforestation and the depletion of ozone.

Prerequisite: Permission of instructor

Fall, alternate years, 2 credits, Letter graded (A, A-, B+, etc.)

Course Learning Objectives:

- Understand the basic physics, chemistry and geology of the earth/atmosphere system that results in global warming and global change
- Learn about the types of data that are needed to assess whether or not the environment has changed and the uncertainties associated with data interpretation
- Understand what is known (and not yet known) to date about global change including changes in temperature, the cryosphere, the ocean, the biosphere and sea level
- Understand the role that natural variability and human activity have played in the changing climate
- Assess the latest state of knowledge in these areas (using latest IPCC reports and recent literature)
- Learn about some of the “solutions” that have been proposed to stop or reverse climate change

These objectives will be met through participation in lectures, reading assigned course material and completing written assignments.

Course Requirements:

Attendance

Participation counts, but you can only “participate” if you attend class and if you read the material assigned in advance.

Assignments/Readings

Reading assignments for each class are listed on the schedule. Other class assignments will be announced in class and posted on Blackboard. The assignment will continue to be posted on Blackboard until the due date.

Grading:

Course requirements: As this is a graduate seminar, grades will be based on class participation (which means you should plan to do the readings) plus short reports on articles in papers or in the scientific literature, plus a classroom presentation and term paper on a relevant topic of your choice.

Paper Topics will be due the last week of September. An outline and at least a partial list of references is due the first week of October. Exact due dates will be announced. Each student will research a particular problem and will make an oral and written presentation.

In addition, each student will bring in 5 articles over the semester together with brief (approximately 1-2 page) summary of article and its contribution either to basic climate change research or to solution of some sort to climate change related problem.

Grade will be assigned based on class participation (20%), class presentation (30%) and written paper (30%) and short papers on “recent articles” (20%).

Meeting Schedule:

MAR 527 will meet weekly for 110 minutes

TOPIC (readings will be assigned from latest IPCC volume and from Archer and Rahmstorf)
Organizational meeting

Historical overview of climate change science: what is the greenhouse effect, nature of greenhouse gases, evidence for changes in temperature and atmospheric composition (CH₄, CO₂, N₂O, freon, isotopes);

Observations of atmospheric surface and climate change, Source of uncertainties in data; how do we deal with them; changes in atmospheric constituents and in radiative forcing

Role of the ocean in controlling CO₂

Paper topic should be chosen by this date.

Observations of changes in snow, ice and frozen ground

Paleoclimate record and what it tells us

List of references for paper due

Effects of global warming on the biosphere: effects of deforestation, agriculture, animal husbandry, effects on vegetation (temp, climate); coupling between changes in climate system and biogeochemistry

Sea level change

Student presentations

Student presentations

Student presentations

Student presentations

Student Presentations

Class Resources:

IPCC (2014) Climate Change 2013: the Physical Science Basis Stocker et al., Cambridge University Press

<http://www.ipcc.ch/report/ar5/wg1/>

TEXT BOOK: Archer, D. and S. Rahmstorf (2010) The Climate Crisis: an introductory guide to climate change, Cambridge University Press (www.cambridge.org)

Blackboard: This course has a website on Blackboard to provide supplementary information to the lectures, distribute and receive homework assignments, post grades as assignments and exams are completed, announce extra credit opportunities or any changes in the lecture schedule etc.

University policies:

Americans with Disabilities Act: If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at (631) 632-6748 or <http://studentaffairs.stonybrook.edu/dss/>. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website:
<http://www.sunysb.edu/ehs/fire/disabilities.shtml>

Academic Integrity: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the Academic Judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

Critical Incident Management: Stony Brook University expects students to respect the rights, privileges and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

In addition these University policies will apply

- Academic Progress & Standing Policy

http://sb.cc.stonybrook.edu/bulletin/current/policiesandregulations/policies_expectations/academic_standing.php

- Minimal Instructional and Student Responsibilities

http://sb.cc.stonybrook.edu/bulletin/current/policiesandregulations/policies_expectations/participation_universities_supported_activities.php

- Equivalent Opportunity/Religious Absences

http://sb.cc.stonybrook.edu/bulletin/current/policiesandregulations/policies_expectations/equivalent_opportunity_religious_absences.php