

# Climate, Oceans, and the Marine Biosphere

## MARS 8050 - Fall 2013

**Course content:** This graduate level course will focus on the climatic role of the ocean and its biosphere, with particular emphasis on connections between human activities, climate, ocean circulation, and marine ecosystems; open to all interested graduate students. We will read and discuss classic papers of climate change and carbon cycle science. Format now includes more hands-on data analysis and policy making.

**Lecture:** 12:30-1:45 - Tuesday and Thursday  
Room 239 - Marine Science Building

**Professor:** Dr. Patricia L. Yager (Ph.D, 1996, University of Washington)  
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Office hours: By appointment (at sea Aug 31-Oct 11)

*I am happy to answer any questions you have about the course, the course material, or your grade. The best way to reach me outside of class is by email.*

**Texts** (Recommended but not required):

**The Oceans and Climate, 2nd Edition.** Grant R. Bigg. Cambridge University Press, 2003. (\$55 at Amazon.com)

**The Warming Papers.** David Archer and Ray Pierrehumbert (Eds). Blackwell Publishing Ltd., 2011. (\$58 at Amazon.com)

**Web CT:** We will make copies of all lecture overheads available (in both PDF or MS PowerPoint format) through the UGA eLearning Commons (eLC). For complete information on the use of eLC please logon to your MyUGA (<https://my.uga.edu/>) and click on eLearning Commons (<https://www.elc.uga.edu/>). Once you log into eLC you will find all the courses you are authorized to use. Click on the MARS 8050 link and you will immediately see a link to Course Content. If you do not see "MARS 8050 (Yager)", let us know so we can give you access. If you encounter any problems, please let us know so we can fix them for everyone.

**Academic Honesty:** All students are responsible for maintaining the highest standards of honesty and integrity in every phase of their academic careers. The penalties for academic dishonesty are severe and ignorance is not an acceptable defense. Please make yourself aware of UGA's Academic Honesty policy by checking out the following web page: [http://www.uga.edu/ovpi/academic\\_honesty/academic\\_honesty.htm](http://www.uga.edu/ovpi/academic_honesty/academic_honesty.htm). If you have any questions about this policy, or what constitutes "academic dishonesty," please don't hesitate to talk with one or both of us.

**Grading.** Your final letter grade will be based on 15 weekly assignments (40%), class participation (20%) and a research paper due at the final exam (40%). Weekly assignments will

be either one-page written summaries of the week's lectures, problem sets, or one-page summaries of journal articles. The research paper at the end of the term will be approximately 10 pages (plus references) and you may select your preferred format: 1) a review paper, 2) an NSF-style proposal for new research, or 3) a manuscript-style research contribution relevant to the course topic.

**Tentative lecture schedule (subject to change):**

Week	Date	Topic	Assignment
1	August 13-15	The Climate System: Heat budget, mean circulation Climate variability - geologic time	Lecture note summary
2	August 20-22	Reading assignment	Summary
3	August 27-29	Reading assignment	Summary
4	September 3-5	Reading assignment	Summary
5	September 10-12	Reading assignment	Summary
5	September 17-19	Reading assignment	Summary
7	September 24-26	Climate models - Box models Climate Models - GCMs	Problem set
8	October 1- 3	Climate models - Box models Climate Models - GCMs	Problem set
9	October 8-10	Global Carbon Cycles	Problem set
10	October 15-17	Ocean biogeochemistry - how do models incorporate ecosystems	Paper summary
11	October 22-24	Phytoplankton guilds / biomes A case for regional models?	Paper summary
12	October 29-31	Climate change in the field - experimental approaches	Paper summary
13	November 5-7	Ocean acidification - passive uptake, biosphere response	Paper summary
14	November 12-14	Human health implications - pathogens and toxic algae	Paper summary
15	November 19-21	Policy implications and communicating science to the policy makers	Discussion and paper summary