

**A ENV 480: Climate Laboratory
Spring Semester 2014 (class number: 8494)**

Instructor: Professor Brian Rose

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Office hours: Tuesdays, 2 – 4 pm (or by appointment)

Meeting time: Tuesday, Thursday 10:15 – 11:35 AM

Meeting place: ES 328

Website: http://www.atmos.albany.edu/facstaff/brose/classes/ENV480_Spring2014/

Teaching Assistant: Nicholas Schiraldi

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Office hours: Monday 9 – 10:30 am (or by appointment)

Grading: A-E, 3 credit

Participation: 10%

Midterm exam: 25%

Assignments: 35%

Final project: 30% (written report = 25%, oral presentation = 5%)

Prerequisites: A MAT 113 or A MAT 119, A ATM 210, A ATM/ENV 315*

* This requirement may be waived for students with prior computer programming experience

Course description and objectives:

This is a hands-on course in climate modeling, in which students will gain an appreciation for what climate models are, what their limitations are, and how they can be used to study natural phenomena. Topics include the physical laws governing climate and climate change, the hierarchy of model complexity, parameterization versus simulation, using models for prediction versus understanding, application of simple climate models to past and future climates on Earth (including radically different climates of the past such as Snowball Earth), accessing and analyzing results from IPCC models. Students will gain significant computer experience making calculations, analyzing results, and interpreting their significance.

Course requirements:

- Attendance and participation during in-class exercises
- A computer with internet access and a Python environment
- Recommended: a personal laptop computer with Enthought Canopy
- Completion of regular assignments and final term project

- Final project: written reports due Thursday May 8 2014 (last day of classes). Oral presentations will occur during the last week of classes.

Attendance and participation policy:

A significant portion of the course grade is given for class participation. You are expected to attend all lectures and participate fully in class discussions and exercises. Any absence should be discussed with Professor Rose **in advance** whenever possible (email preferred). UAlbany policies for Medical Excuses can be found here:

http://www.albany.edu/health_center/medicalexcuse.shtml

Assignments:

Much of the course will consist of hands-on computing exercises, including both in-class exercises and homework. We will use the computer language Python for our exercises and calculations. We recommend software called Enthought Canopy, which provides all the Python tools we will need. See the class web page for installation instructions. Python code files will be provided through the web page for each exercise. The goal of the exercises will be to carry out scientifically meaningful calculations. We will therefore view our efforts in learning to work with Python code as a means to an end, not an end in itself. Grading of homework will be based more on scientific content and understanding than on programming skill. The TA is available for computing assistance.

Mid-term exam:

We will have an in-class exam on Thursday March 13 (last class before Spring Break). Details will be discussed closer to the exam date.

Final project:

There will be no final exam. Each student will complete a small independent research project, submit a written report and give a brief oral presentation to the class. You will choose your own topic (in consultation with the instructor and TA), exploring an issue in climate science and climate modeling. The project must include some original calculations described and carried out by you, as well as references to the peer-reviewed scientific literature.

Your written report should be roughly 5 to 10 pages in length, and should contain:

- A one-paragraph abstract summarizing the paper
- An introduction giving a concise description of your scientific problem.
- A brief review of relevant results from at least two published articles.
- A description of your calculation.
- Results of your calculation summarized in graphs and/or tables as appropriate.
- A brief discussion of your results, including its shortcomings.

The grade for the written papers will be determined by both scientific content and clarity of presentation. Reports are due Thursday May 8 2014 (last day of classes) by 5 pm (in person or by email). *Late papers will be subject to a grade penalty of 5/25 per day.* We recommend following the American Meteorological Society manuscript guidelines: <http://www2.ametsoc.org/ams/index.cfm/publications/authors/journal-and-bams-authors/journal-and-bams-authors-guide/components-of-a-manuscript/>

The purpose of the oral presentations is to share your work with your classmates and practice your presentation skills. Each student will give a 10-minute presentation,

followed by a brief class discussion. Grades for the oral presentation will be based primarily on clarity. Oral presentations will be scheduled for Tuesday May 6 and Thursday May 8 (the last two class days).

You will work independently on your own project. However we strongly encourage you to discuss with your classmates and give each other feedback along the way. You will be asked to submit a one-paragraph project proposal by Friday March 14 (last day before Spring Break).

Academic integrity:

In this class we will strive to be interactive, learning by doing and by discussion. Some collaboration on exercises is therefore encouraged. However you are ultimately expected to submit your own work and your own thoughts, and to give proper credit to others for previous work and ideas. Please refer to the UAlbany academic integrity policies here: http://www.albany.edu/undergraduate_bulletin/regulations.html