

Planetary Sciences 212/212H

The Science and Politics of Global Warming

Classes: Space Sciences 312 Tu, Th 2:00-3:15, Instructor: Dr. Uwe Fink, 621-2736, email: uwefink@lpl.arizona.edu

Office & Hours: Space Sciences 249 Mo, We, Fri 11:00-12:00 am or by appointment

Course Description, Objectives, Philosophy:

The fundamental principles of the greenhouse effect will be addressed in a quantitative manner. This will require knowledge of the nature of light, temperature, their measurement, black body radiation, atmospheric structure, composition and opacity, as well as basic concepts of radiative transfer.

These topics will be covered in a set of formal lectures, home works, class papers/projects and laboratory exercises during roughly the first two thirds of the course.

Some of this material will use the students' scientific research papers/projects (see below). This will encourage students to develop critical thinking skills by carry out independent research.

The last third of the course will be devoted to the economic /political aspects of global warning.

Honors portion (212H):

--Originally the course was designed only as an honors course (212H). It has now been expanded to include a regular 212 section. Enrollment in each is limited to 15 students.

--Honors students are expected to help and mentor the others in their home works, class projects, and lab projects.

--Honor students are expected to complete and hand in 1. a scientific research paper and 2. a paper on a political subject.

--Non-honors students will be required to hand in the economic/political research project only. They will however be required to participate in the research on the scientific research paper.

Required knowledge: This is a Tier 2 **science** course and students taking it are expected to have completed two Tier 1 science courses, as stated in the course catalog requirements. Thus students are expected to have knowledge of basic physical science principles such as units, basic algebra and simple logical calculations

Text: There is no regular text for this class. The instructor will hand out a set of class notes during the semester, which will serve as the basis for the formal portion of the course

Lab Exercises: Two lab exercises will be conducted in class. Notes and analysis procedures will be handed out for each. Each student will be required to complete and hand in a lab report on each of the two subjects.

Grading:	212	212H
Attendance	10%	10.0 %
Spectroscopy Lab Exercises	15%	12.5%
Solar Cell Lab Exercises	15%	12.5%
Mid Term (tentative date Th Mar 13)	30%	25.0%
Home works	15%	15.0%
Research Paper 1 (scientific)	--	12.5%
Research Paper 2 (political)	15%	12.5%

Attendance Policy:

- Three excused absences (i.e. 10% of the course) will be permitted during the semester.
- For an excused absence, the student must inform the teacher by the class period before the absence.
- For every absence exceeding three, unexcused or excused, one point will be deducted from the Attendance score. If you miss more than 20 min of a class, it is considered an absence.
- A volunteer honors student will be selected who is in charge of taking attendance for the whole semester.
- All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion.
- Absences pre-approved by the UA Dean of students (or Dean-designee) will be honored.

Exams and Home works:

- The mid term will cover approximately the first two thirds of the course consisting of the formal class lectures. It will include the scientific presentations and the spectroscopy lab exercise
- About five homework assignments will be handed out. They are intended to give the student practice in carrying out quantitative calculations and learning the material. They will also give the instructor a feeling he level of understanding of the class.

Research Papers/Projects:

There will be two research papers/ projects. The first project will be on a scientific subject required by honors students only. The second project will be on the economic/political aspect of global warming, required for all students.

- Each research project will consist of a 10-15 minute talk in class and a short 3-4 page paper.
- For the projects the class will be divided into roughly 6-8 groups of 4 students each, depending on enrollment.
- Each group will consist of one or two honors students and one or two regular students. The honors student(s) will serve as mentors to the others. One of the honors students will be the leader of the project.
- Each group will select a topic they wish to work on. The topics can be selected from a list of topics handed out by the instructor or each group can pick a topic relevant to global warming in which they are particularly interested in.
- Each group is required to make an outline of their project and discuss it in a meeting with the instructor within two class periods of choosing a subject.
- For the economic/political project all students in the group will be required to give a part of the presentation.
- For the scientific project each of the honors students only will be required to give a portion of the presentation.
- Students are required to hand in **their own** short 3-4 pages write up. **References to the source material** and a bibliography are required.
- For the scientific research project each group is required to hand in two questions on their topic which may be included in the mid-term exam.

Late/Incomplete work policy:

For assignments turned in late, one letter grade will be deducted for each class period of lateness, unless special arrangements have been made with the instructor.

The grade of I may be awarded only at the end of a term, when all but a minor portion of the course work has been satisfactorily completed. The grade of I is not to be awarded in place of a failing grade or when the student is expected to repeat the course; in such a case, a grade other than I must be assigned. Students should make arrangements with the instructor to receive an incomplete grade before the end of the term.

Classroom Behavior: Please note that the Arizona Board of Regents' Student Code of Conduct, ABOR Policy 5-308, prohibits threats of physical harm to any member of the University community, including to one's self. See: <http://policy.web.arizona.edu/~policy/threaten.shtml>.

Special Needs and Accommodations: Students who need special accommodation or services should contact the Disability Resources Center, 1224 East Lowell Street, Tucson, AZ 85721, (520) 621-3268, FAX (520) 621-9423, email: uadrc@email.arizona.edu, <http://drc.arizona.edu/>. You must register and request that the Center or DRC send me official notification of your accommodations needs as soon as possible. Please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate. *The need for accommodations must be documented by the appropriate office.*

Student Code of Academic Integrity: :Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <http://dos.web.arizona.edu/uapolicies/>.

Confidentiality of Student Records: See <http://www.registrar.arizona.edu/ferpa/default.htm>

Subject to Change Statement: Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.

2008-01-16

**PTYS 212/212H Science and Politics of Global Warming
Room 312 Tuesday and Thursday 2:00 – 3:15**

- Jan 17 -- Introduction; Overview; The Sun: energy output and seasons.
22 -- Energy definition and Temperature scales
24 -- Basics of Spectroscopy and Light
29 -- Spectroscopy and Light continued
31 -- Perform Spectroscopy experiment in class
- Feb 05 -- Temperature and Radiation
07 -- Equilibrium Temperature of Earth and Planets
12 -- Earth's Atmosphere: Composition, Structure
14 -- Greenhouse gases, IR opacity
19 -- Atmospheric transmission
21 -- Class presentations I
26 -- Recap and Summary of presentations I and Anthropogenic CO₂
28 -- Class presentations II
- Mar 04 -- Recap and Summary of Class presentations II
06 -- Radiative Transfer Basics and the Greenhouse Effect
11 -- Review; Radiative Equilibrium; earth's temperature record and its past climate
13 -- Mid Term
18 -- *Spring Break*
20 -- *Spring Break*
25 -- Review of Mid-term
27 -- Guest lecture TBD
- Apr 01 -- Solar Cell experiment
03 -- Review solar cell experiment; Hydrogen Fuel cell car
08 -- Kyoto treaty Overview; World Energy production
10 -- Carbon sinks and sources
15 -- Political/Economic topics I
17 -- Guest lecture: Tom Hansen? Tucson Electric Power
22 -- Review of Renewable resources, particularly Solar energy
24 -- Political/Economic topics II
29 -- Recap and class discussion of Kyoto treaty
- May 01 -- Recap; use of renewable resources and conservation and mitigation measures
06 --Review and Summary