

GEOSC. 497A ICE AND CLIMATE SPRING 2007

Time and Place: TR 2:30-3:45 PM, Room 008 Deike.

Profs.: Richard Alley, 517 Deike Building, 863-1700, ralley@essc.psu.edu
Sridhar Anandakrishnan, 442 Deike Building, 863-6742, sak@essc.psu.edu
Dancing penguins, musk oxen (musk ox? musk oxes?), etc. on an as-needed basis.

Office Hours: Talk to us, we'll set something up.

Text: There are a few good books, including W.S.B. Paterson, *The Physics of Glaciers*, as well as the books by C.J. Van der Veen, R. LeB. Hooke, and T. Hughes. Some are on reserve in the Penn State library. We didn't assign a text and have the bookstore buy it, because we will supply what you need in class. But if you like books, we suggest you get one or more.

Grading: This is an upper-level class, and it is as important that you demonstrate your mastery of the material. We plan to use: 1) two midterms (20% each), Tuesday, February 20 and Tuesday, March 27; 2) one take-home, two-hour, open-book final exam (as in: don't dare spend more than two hours on it, but you can do it at your convenience and not ours, handed out April 26 and due May 8 at 5 pm although we'll take it earlier if you want to be rid of it) (30%); plus 3) a term paper (details to be announced, but think 10 pages, due April 26) (30%).

Material Covered: a) How do glaciers work? Leading to a general understanding of the way glaciers flow and how they respond to changes in their environment (the techniques here are also useful in study of similar problems such as groundwater flow, mountain-belt spreading, etc.). This will probably take most of January through March. b) How do glaciers (and snow and sea ice) interact with ice ages and greenhouses? This will take April and the onset of May.

Why Ice and Climate? For some of you, to keep advisors off your backs. Also, ice provides the biggest control on sea-level change over time scales of human interest, preserves the best records of past climate change, contributes greatly to the amplification of climate changes in polar regions through ice-albedo feedback, directly affects oceanic hence atmospheric circulation through freshwater fluxes, and plays a major role in landscape and mountain-belt evolution and global biogeochemical cycling. Plus, it's cool.

Exposure. We will try to show you lots of pictures of ice, what ice does, how people work on ice, etc. We plan to devote the first part of most classes to this. If you have good slides, please volunteer for a 10-15 minute segment. You will earn our gratitude, the respect of your peers, and highly valuable brownie points that you can use to impress your friends or the cast of "Whose line is it, anyway?".

CRISIS. The Center for **R**emote **S**ensing of **I**ce **S**heets is the slightly strained acronym of a really important National Science Foundation Science and Technology Center, headquartered at Kansas, with Sridhar Anandakrishnan as science director. This operation brings important resources (dollars) into our field, provides a focus for research, education

and outreach, enhances visibility, helps jobs, etc. This course is being offered via web to several CReSIS sites as well as at Penn State. This has advantages and disadvantages. Please bear with us as we figure it all out. The indefatigable Peter Burkett is active in making this work, so thank him.

Integrity statement.

Penn State requires each professor to clarify his/her usage of integrity standards for each class. Why they can't just come up with a statement and use it is beyond us, but rules are rules. So, be nice.

In legalistic detail (and we apologize for having to do this):

- Outside of class, you are free to discuss work with others and to compare results, but you must actually do the work you hand in. Direct copying from others is not allowed. You may not download text, figures, etc. from the web or other sources and use them in a term paper or exam largely or completely unchanged without attribution; any such usage must be referenced and limited.
- On exams, keep your eyes on your own paper and do not talk to other students during the exam. Exams are "closed book" unless otherwise specified by us; do not consult books, notes, or other hard-copy, electronic, or liveware-beyond-your-own-brain recordings of information during the exams. In particular, you may not use your cell phone or other wireless or wired electronic devices to store or access information during exams. Exams are the property of Penn State and must be returned at the end of each exam; do not steal test forms. We and any assistant(s) reserve the right to change student seating, to ask that ball caps be removed or turned backward, and to make other such changes as needed to prevent cheating or to allow us to see better what is occurring. Exams are to be taken only when scheduled unless you have prior arrangement with us.
- Violation of these rules will lead to a zero on the exam or exercise on which the violation occurred. A second violation will lead to failure of the course.
- Be polite to your neighbors and to us. Don't read the newspaper in class, talk to neighbors, play a radio, talk on a cell phone, or otherwise make a nuisance of yourself. And don't try to save yourself 10 seconds by noisily packing up your books just before the class ends.
- Additional insight is available at <http://www.ems.psu.edu/admin/integ.html>
- In return, of course, you can expect us to be polite, punctual, fair, informative, etc. If you do not think we are meeting these requirements, there are several options open to you, including: i) talk to us, in public or in private, alone or with a group; or ii) talk to one of our "superiors" (Geoscience Undergraduate Program Chair Dr. David Bice in 540 Deike, Geoscience Graduate Program Chair Dr. Kate Freeman in 508 Deike, Geosciences Department Head Dr. Tim Bralower in 503 Deike, College of Earth and Mineral Sciences Associate Dean for Education and Acting Dean Dr. Robert Crane in 104 Deike, or College of Earth and Mineral Sciences Affirmative Action/Equal Opportunities Officer Dr. Cynthia Freeman Fail in 014 Deike. The University also has ways for you to complain, but you are probably better off staying closer to the source. If you are having problems unrelated to us, you are also welcome to contact any of these sources; they are good people.
- It is our fond hope that the rules here are unnecessary, and we all get along without need to refer to them. Have a great semester.