

OHIO STATE COURSE CHANGE REQUEST

College Mathematical and Physical Sciences

Department School of Earth Sciences
(e.g., Portuguese)

Book 3 Listing: Geological Sciences

Proposed Effective Qtr/Yr: SU AU WI SP YEAR: 2007
(See *OAA Academic Organization and Curriculum Handbook* for Deadlines)

A. Course Offerings Bulletin Information. Follow instructions in the *OAA Academic Organization and Curriculum Handbook*. Before you fill out the "Present Course" information, be sure to check the latest edition of the Course Offerings Bulletin and subsequent Circulating Forms. You may find that the changes you need have already been made or that additional changes are needed.

* If the course offered is less than quarter, term, or semester, please also complete the Flexibly Scheduled/Off Campus/Workshop Request form.

COMPLETE ALL ITEMS THIS COLUMN

Present Course

1. Book 3 Listing: Geological Sciences
2. Number: Geol Sci 580
3. Full Title: Standards-Based Earth Science for Educators
4. 18-Char. Transcript Title: STD BSD EAR SCI ED
5. Level and Credit Hours: UG 5
6. Description: Application of geological principles and interpretation of Earth features in selected areas, with related research reports and teaching units
(25 words or less)
7. Qtrs. Offered: SU AU WI SP
1st SEM 2nd SEM
8. Distribution of Contact Time: field, lab, and/or classroom
(e.g., 3 cl, 1 3-hr lab)
9. Prerequisite(s): 15 qtr hrs in physical or biological sciences or permission of instructor
10. Exclusion: not for BA or BS crdt in Geol Sci
(Not open to...)
11. Repeatable to a maximum of 15 credits.
12. Off-Campus Field Experience: an option
13. Cross-listed with: NA
14. Check the curricular requirement this course fulfills:
BER LAR GEC 3rd writing course
15. Grade option (circle): Ltr S/U P
If P graded, what is the last course in the series?
16. Is an honors version of this course available? Y N
Is an Embedded Honors version of this course available? Y N

17. Other general course information:

COMPLETE ONLY THOSE ITEMS THAT CHANGE Changes Requested

- _____
- _____
- _____
- _____
- UG 1 - 5
- _____
- _____
- SU AU WI SP
1st SEM 2nd SEM
- _____
- _____
- Repeatable to a maximum of _____
_____ credits:
- _____
- Cross listed with: _____
- Check the curricular requirement this course fulfills:
BER LAR GEC 3rd writing course
- Grade option (circle): Ltr S/U P
- Last course in Progress series: _____
Y N

B. General Information:

1. Do you want prerequisites enforced electronically? YES NO
(See OAA Academic Organization and Curriculum Handbook for what can be enforced.)
2. Does this course currently satisfy any GEC requirement? YES NO
3. What other units require this course? None
Have these changes been discussed with those units? NA YES NO
4. Have these changes been discussed with academic units that might have a jurisdictional interest in the subject matter? NA
[Attach relevant letters.] NA, we are teaching the basics of science to educators.
An information copy sent to Science Education group (MEd) YES NO
5. Is the request contingent upon other requests? YES NO

List: BUT request is also being accompanied by a request for flexible scheduling that also seeks 3 crdt hr.

6. Purpose of the proposed change. (If the proposed change affects the content of the course, attach a revised syllabus and course objectives.) To accommodate shorter topics and improve flexibility.
Content of the course is variable depending on the topics and techniques. No impact.
7. Describe any changes in library, equipment or other teaching aids needed as a result of the proposed change:
None required
8. If the proposed change involves budgetary adjustments, describe the method of funding:
NA

APPROVAL SIGNATURES (As needed, All signatures on lines in ALL CAPS (e.g. ACADEMIC UNIT) must be completed)

Academic Unit Undergraduate Studies Committee Chair (Undergrad course)	Printed Name	Date
Academic Unit Graduate Studies Committee Chair (Undergrad/Graduate course)	Printed Name	Date
<i>Lawrence Kriesek</i>	LAWRENCE KRISSEK	3/29/2007
School/College Undergrad Curriculum Committee (Undergrad/Grad course)	Printed Name	Date
<i>Lawrence Kriesek</i>	LAWRENCE KRISSEK	3/29/2007
School/College Graduate Curriculum Committee (Undergrad/Grad course)	Printed Name	Date
<i>Frank W. Schwartz</i>	FRANK W. SCHWARTZ	3/29/07
ACADEMIC UNIT CHAIR/SCHOOL DIRECTOR	Printed Name	Date
COLLEGE DEAN	Printed Name	Date
Graduate School (If Appropriate)	Printed Name	Date
ASC Curriculum Committee Chair (If Appropriate)	Printed Name	Date
University Honors Center (If Appropriate)	Printed Name	Date
Office of International Education (study tour only)	Printed Name	Date
ACADEMIC AFFAIRS	Printed Name	Date

Syllabus Geological Sciences 580 Teaching About the Cryosphere

Summer Quarter, 2007 The Ohio State University, Columbus, Ohio

3 Credit Hours (quarter) Call Number : TBA

When: June 18- June 29, 2007

Where: Byrd Polar Research Center, 136 Scott Hall, 1090 Carmack Rd., OSU West Campus

COURSE DESCRIPTION

"Teaching About the Cryosphere" is offered as a summer course to provide learners with a better understanding of how the scientific community assesses evidence of climate change by studying ice. It will focus on research conducted at the Byrd Polar Research Center (BPRC) that detects, describes, and displays evidence of climate change, particularly in polar and alpine regions of the world. The course will offer a basic introduction to glacier dynamics and glacial geology, remote sensing and satellite imagery, methods used to study the extent and condition of Earth's cryosphere, and basic modeling (especially related to atmospheric processes). Students in this course will establish a Learning Community and will cooperate and collaborate to maximize participation and to develop and share resources.

The course is designed to provide teachers and others who are interested in the measurement and assessment of climate conditions with a fundamental understanding of the science principles involved in ice movement, accumulation and ablation of snow/ice, remote sensing, gathering and managing data, and the process of model development about cold regions. Then instruction will focus on what should be taught at K-12 levels, and how to incorporate these concepts into meaningful instruction.

The course will showcase cutting-edge research at BPRC and enable participants the opportunity to interact with the research scientists, see their laboratories, and meet some of their graduate students to better understand the research process. Course participants will be given images and/or datasets and will learn and share strategies for presenting this information to students using instructional technologies such as SMART Boards, probes that record and graph changes, and developing and editing video segments to incorporate into lessons.

Participants will develop a unit or module that will communicate their experiences with the researchers and convey their understanding of course materials and instructional technologies to others. Project presentations will occur at the end of the course.

COURSE FORMAT

This course will be offered for two weeks, 3 hours per day (9:00-12:00), during Summer I at OSU. The class will consist of lectures, demonstrations, small group sessions with scientists, and lab activities. Additional credit can be earned by enrolling for independent study credit hours in Summer Session I or Summer Session II.

RATIONALE FOR THIS FORMAT

This course requests a flexible schedule to accommodate area teachers whose school year end on different dates. The rationale for offering the course in Scott Hall is to offer opportunities to see the scientists where they work, to have access to data and to imagery, and because the Learning Center (P-12 Scholars Program) is equipped to model instruction with informational technologies and to provide teacher access to the equipment for their lesson/unit development.

PREREQUISITES

15 hours physical and biological sciences or permission of instructor.

COURSE OUTLINE AND SCHEDULE

Week 1:

Monday June 18: **Glaciers (Dr. Garry McKenzie)**

Assignment: (Read Benn & Evans: geographic areas where permanent snow exists; accumulation/ablation; analogs to Mars and extra-terrestrial environments; label maps of polar regions; explain Milankovitch and other influences on ice; research conditions during polar nights). Identify applicable state content standards and indicators.

Possible activities: illustrate SMART Board features, brainstorm ideas for projects, examples and images of ice caps, (use glacier observation activity); distinguish between ice fields and glaciers; measurement of glaciers (visual & radar) offer "photogrammetry" demo—Brecher; optional communication w/ students who attend schools near the Arctic Circle; de-brief, research background and describe criteria for projects, then free-write/journal, and quiz.

Tuesday June 19: **Glacial dynamics and glacial geology (Dr. Garry McKenzie)**

Assignment: TBD Identify applicable state content standards and indicators.

Possible activities: videotape the learning activity with solids that flow & illustrate video editing techniques; have Sarah or Henry show research from snow pits (*Girls on Ice* footage/presentation?); set up ice core activity for tom'w (to show physical evidence in ice cores); map glacial features in Ohio, de-brief, work on projects (enhance notebooks/resource lists), free-write/journal, and quiz

Wednesday June 20: **Paleoclimate (Dr. Leonid Polyak?)**

Assignment: TBD (read about past glacial and interglacial periods; climate analyses; evidence of past climates; role of oceans/conveyor belt? sediment cores/varves; identify applicable state content standards and indicators.

Possible activities: use dendrochronology activity as a physical example of layers and comparisons. Then, examine other examples of proxy data (data mining activity) & create "status report" of each (from group—jigsaw); El Nino and La Nina years

Thursday June 21: **History from Ice Cores (Thompson group)**

Assignment: TBD Oxygen isotopes, albedo, identify applicable state content standards and indicators.

Possible activities: ice core activity; compare and contrast land/sea differences in N & S Hemispheres; examine inclusions in the ice (insects); consider exposed plants and other biota; tour of lab/storage facility; measure and assess changes in Qori Kalis, examine Kilimanjaro aerials; debrief, videotape use of temperature probe with melting ice.

Friday June 22: **Polar Meteorology and Modeling (Dr. Andy Monaghan?) ☺**

Assignment: TBD basic models; define climate, consider extremes and other means of comparisons; compare and contrast GCMs; consider importance of atmo-ocean coupling; testing the models; identify applicable state content standards and indicators.

Possible activities: work with the Last Glacial Maximum (LGM) model and contrast that with current climate (Toracinta); use simulations or visualizations; consider snowfall on Antarctica (Monaghan, et al.); students describe/define their projects with preliminary outline; show clips from *Day After Tomorrow*; collect information on other pop culture references to global climate change (fiction or nonfiction); debrief, brainstorm activities based on media references and/or on-line searches, free-write/journal, and quiz.

Monday June 25: **Remote sensing basics** (*Dr. Carolyn Merry? or Steve Mather*)

Assignment: Research on-line resources (Google Earth and NASA websites); identify applicable state content standards and indicators; assess prospects for satellite use ("space junk", aging programs, new efforts, private efforts, etc.)

Possible activities: de-brief, explore local maps & images, show 3-4 different platform/sensor combinations; problem-solving (what's best to use?); camera/speed-trap examples; free-write/journal, and quiz.

Tuesday June 26: **Different kinds of remote sensing that show climate change** (*presenter?*)

Assignment: TBD (revisit proxy data); Sea Surface Temp (SST), chlorophyll conc.; sea ice extent; green up dates; corals;

Possible activities: use of proxy data, ice core simulations, data mining; discuss activity selection and format for projects, free-write, and quiz.

Wednesday June 27: **Sea Level Rise** (*Dr. C.K. Shum?*)

Assignment: TBD; geodetics, mean sea level; saltwater incursion; estuaries and other coastal environments; population near coasts; small island developing states, storm impacts, etc. *

Possible activities: sociology of coastal change; examine technologies used for levees, etc.; examine research about coastal erosion; history and impact of El Nino and LaNina events; flooding in Venice?;

Thursday June 28: **LTER and/or Implications for OH/Midwest** (*Kurt Waltzer?*)

Assignment: TBD; importance of long-term ecological research; LTER Network; implications of climate change to date; predictions for Midwest and Ohio (*Ohio Climate Road Map, Parts I and II*)

Possible activities:

Friday June 29: **Presentations by teachers**

Activities: peer assessment of presentations, constructive criticisms and alternative ideas for adaptations and/or extensions, course evaluation, distribution of image and datasets.

READING ASSIGNMENTS AND REFERENCE MATERIALS

Materials are being selected by collaborating faculty and include on-line materials from governmental agencies and journals available to students through OSU's library system, and paper copies of maps, reprints, and reports available from the Goldthwait Polar Library of the BPRC.

The standard reference for the cryosphere that will be used in the course is:

Benn, D. I, and Evans, D.J.A. (1998). *Glaciers & Glaciation*. New York: John Wiley and Sons.

OBJECTIVES

The basic course objective is to provide participants with improved understanding of the nature and evidence of climate change, as revealed by research on the cryosphere, provided for participants by scientists from Byrd Polar Research Center. Additionally, participants will collaboratively build curricular materials that will be useful in their educational roles.

METHODS OF EVALUATION

Student participation and progress will be assessed through daily quizzes (20%), project presentation (40%), and completion of in-class activities (40%). Letter grades will be assigned.

Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (http://studentaffairs.osu.edu/info_for_students/csc.asp).

Disability Services

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomierene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>

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