University Studies
Cluster Course Addition
Adding a previously unapproved course to a cluster

(When addressing questions, please attach a separate sheet)

PROPOSING FACULTY: Michael L. Cummings, Geology

1. THE COURSE

A. COURSE TITLE, NUMBER, AND CATALOG DESCRIPTION
Top: Climate Record in NW Geology, G399, Examination of climate change in the Pacific Northwest as recorded in geologic deposits of the last 65 million years. Review of the methods used to study paleoclimate, the assumptions upon which they are based, and the fidelity of the record. Field and laboratory investigations are an integral part of the course.

B. DEVELOPMENT
The course is being developed for first offering during summer 2004. However, the ideas for this course go back many years. It is now an appropriate time in the evolution of the Global Environmental Change Cluster, the Department’s curriculum, and interest in climate change to introduce this course.

C. AVAILABILITY
With what regularity has the course been—or will the course be—offered? The course will initially be offered during summer term in 2004. During 2004-2005 the course will be offered during the academic year and will alternate in the department’s offerings with G452U Geology of the Oregon County.

D. PREREQUISITES
List any course prerequisites beyond the cluster Sophomore Inquiry course. Global Environmental Change SINQ is adequate preparation. The course is accessible to transfer students that have completed an introductory science course.

2. COURSE OUTLINE.
Provide a detailed outline of the proposed course, also including its preliminary reading list, and the name(s) of instructor(s) committed to teaching the course. In summer 2004 the course will be offered during a four-week session. The following outline is designed for this course. During the summer offerings the course will rely more heavily on field studies than during the academic year.

First class meeting (18:00-20:20)
Introduction to the geologic record and how climate information becomes incorporated into this record. Sedimentary deposits and soils and the signature of climate. The limits of the geologic record and bias related to preservation potential. Earth’s climate is constantly changing – course theme.

Second class meeting (18:00-20:20)
Records produced by local changes (e.g. development of rain shadows) and global changes (world wide climate changes):
Case studies in Pacific northwest climate:
Climate during the last 10,000 years: Evidence from archaeological sites, sand dunes, soils, and beach deposits. Sea level rise and changing patterns of sedimentation in the Columbia River system.
Climate during the ice ages: The record from landforms, fossils, soils, and sedimentary deposits.
Atmospheric and oceanic circulation during the ice ages.

**Field investigation** of paleosols near Burns (weekend field trip). Emphasis on climate change between 10 Ma (million years) and the ice ages: Oregon’s developing rain shadow. Development of high steppe conditions of southeastern Oregon (10 instructional hours)

**Third class meeting** (18:00-20:20)
Analysis of data gathered during field study including laboratory analysis of samples.

**Fourth class meeting** (18:00-20:20)
Development of temperate climate laterite and bauxite deposits in western Oregon. How these deposits favor the Oregon wine industry and influence agricultural production.

**Field investigation** of laterite deposits in the vicinity of Salem and Columbia River Basalt flows in Silver Falls State Park (6 instructional hours).

**Fifth class meeting** (18:00-20:20)
Volcanic eruptions and climate change. How big or frequent is enough to change climate? How do volcanic eruptions impact weather and potential climate change? What is the size of the system we need to consider? The climate record during eruption of the Columbia River Basalt and the ignimbrite flare up in southwestern U.S.

**Sixth class meeting** (18:00-20:20)
The great climate crash near the Eocene-Oligocene boundary. Climate record of the Clarno Formation of central Oregon.

**Field investigation** of the John Day National Monument and surrounding area (10 instructional hours).

**Seventh class meeting** (18:00-20:20)
The climate record of the John Day formation. Global records from marine and terrestrial settings. How closely do they match? What may have caused this world wide change?

**Last class meeting** (18:00-20:20)
Student presentations based on field investigations, laboratory analysis, Internet and library resources. How do our field studies inform about current patterns of climate change

Readings will be selected from the following sources:
Prothero, The Eocene-Oligocene Transition: Columbia University Press
Prothero, From Greenhouse to Icehouse: Columbia University Press

3. GENERAL EDUCATION GOALS.

**A. COURSE CONTENT & SUITABILITY FOR CLUSTER**

Discuss the course content in relationship to the thematic focus of the cluster. The geologic record of climate change during the last 65 million years in the Pacific Northwest is one of the best records on earth. The record is a profound view of planetary environmental change. Sedimentary deposits, soils, and landforms incorporate evidence of condition at the earth’s surface. In this course students explore these materials and learn to use some of the methods applied by geoscientists to reconstruct the climate record of the past. The course content is a natural for the Global Environmental Change Cluster. It provides the deep time context of global change and provides students with a context to evaluate the current climate change debate.

**B. UNST GOALS**
Indicate what materials and assignments will address those University Studies goals appropriate to the course content and cluster theme (the goals are Inquiry and Critical Thinking, Communication, Diversity of Human Experience, and Ethical Issues & Social Responsibility).

1) Inquiry and Critical Thinking: The analysis of scientific data, how these data are used to construct hypotheses, and the style by which scientific argumentation is developed provide a structure for inquiry and critical thinking in this course. Field investigations provide a rich context for inquiry and allow students to investigate first hand the materials used to reconstruct past climate. The steps between raw field data, hypothesis construction, and using data to support an argument constructed from a fragmentary record stimulate critical thinking. The greatest contribution of the course is the critical thinking that is encouraged in the current debate about climate change and its causes. The course provides the deep context for the critical analysis of current thinking and a basis to evaluate arguments presented by competing positions.

2) Communication: The student presentations during the last course meeting provide opportunity to present findings based on field investigations and linked to in-class discussions and lectures. Interactions with professional staff at the John Day National Fossil Beds provide opportunity to interact with specialists and opportunity to engage in thoughtful discussions. The use of Internet resources as a point of discussion provides students with informal opportunities to discuss important topics in the course. One of the themes developed in the course is communication of information on climate change. There are great differences between information presented in the popular literature/science fiction/Internet resources and information presented in peer-reviewed scientific literature. Students will gain experience evaluating the structure of scientific arguments and how data are used to support hypotheses.

3) Diversity of Human Experience: The context of climate change and how changes impact human experiences is closely linked to our perception of stability. By allowing students to explore the meaning of dynamic changes on a global and local scale in the fundamental topic of climate provides them with a perspective on the human experience as our climate changes. Our human experience is a snap shot within a changing context. Students need to understand this concept.

4) Ethical Issues & Social Responsibility: Although the course is not directly designed to explore ethical issues and social responsibility, these ideas are embodied in our understanding of the world around us. If everything remains as we perceive it to be, our value systems and social interactions are fairly defined. It is in the context of change, in this case climate change that the ethical issues arise and social responsibility is tested.

C. CLASSROOM ENVIRONMENT
Discuss the teaching strategies employed in the course and how they articulate with the student-centered, active-learning strategies characteristic of University Studies courses. The information in this course is provided by a mix of readings and discussions centered on topics of interest, laboratory type analysis of data gathered in field settings, and field investigations that allow students first-hand opportunities to touch, sample, and investigate classic geologic sites. Student presentations on their common field investigation provides opportunity to interact with each other around the interpretation of data and allows presentation skills to be improved.
PROPOSING FACULTY: [Signature]

COURSE TITLE AND NUMBER: 6349W Top: Climate Record m NW Geology

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OBTAIN CHAIR AND CLUSTER COORDINATOR SIGNATURES BEFORE SUBMITTING TO UNIVERSITY STUDIES OFFICE

DEPARTMENT CHAIR(S): [Signature] DATE: 11/13/03

CLUSTER COORDINATOR: [Signature] DATE: 11/13/03

All changes to Clusters must be approved by PSU’s Senate Curriculum Committee.

THE ORIGINAL + 12 COPIES OF THE PROPOSAL MUST BE RECEIVED AT UNIVERSITY STUDIES (CH 163) BY OCTOBER 31, 2003

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COURSE APPROVED FOR CLUSTER INCLUSION

CHAIR, CLUSTER COORDINATORS: ___________________________ DATE: __________

CHAIR, UNST COMMITTEE: ________________________________ DATE: __________
Cluster: Global Environmental Change
Title of course: Top: Climate record in NW geology
Course Number: 9399
Proposing Faculty: Michael L. Cummings
Cluster Coordinator: 

Cluster Course to New Cluster
Other clusters this course is assigned to:

Non 'U' course proposed to Cluster
Removal

UNST Committee-- PASS: Yes ☐ No ☑
If no, reason: ____________________________

UCC Committee-- PASS: Yes ☐ No ☑
If no, reason: ____________________________