University Studies
Cluster Proposal Cover Sheet
2004-2005

Cluster: Global environmental Change
Title of course: Volcanoes + Earthquakes
Course Number: G 45-7
Proposing Faculty: Michael Cummings + Steve Carlson
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: 

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 and Steve Carlson
Department of Geology.

1. THE COURSE
   A. COURSE TITLE, NUMBER, AND CATALOG DESCRIPTION
   Volcanoes and Earthquakes, G457, A study of volcanoes and earthquakes as they affect humans and the
development of landscapes. A field trip is required.

   B. DEVELOPMENT
   Is the course based upon an existing course, or is it a new course under development?
   This is a long established course that is offered as part of our summer offerings. As the Department of
   Geology expands its cluster offerings during the summer, this course is a logical addition to the Global
   Environmental Change Cluster. Steve Carlson, the instructor in recent years, redeveloped the course to
   be consistent with University Studies goals and has offered the course in this format for the last 3 years.

   C. AVAILABILITY
   With what regularity has the course been—or will the course be—offered?
   Offered each summer as part of the Department of Geology summer program. In summer 2003 the
course enrolled approximately 20 students. We may also use the course during the academic year
depending upon faculty interest and funding availability.

   D. PREREQUISITES
   List any course prerequisites beyond the cluster Sophomore Inquiry course.
   Global Environmental Change SINC is adequate preparation. PSU Bulletin lists a prerequisite of “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.
   The following syllabus is for the course as it was offered during the summer of 2003. Steve Carlson
was the instructor.

   Week 1  Introduction-organization.
   Plate tectonics and the distribution of volcanoes and earthquakes.
   Week 2  Volcanic types and associated rocks and effects
   Volcanic processes and the hazards they represent to society
   Cascade volcanoes: understanding the processes and the hazards
   Week 3  Local and regional earthquakes
   Plate boundary earthquakes
   Intra-plate earthquakes
   Field Study: Saturday and Sunday: Evidence for large earthquakes along the north and central
   Oregon Coast. Field investigation of selected sites and examination of tsunami evacuation plans.
   Week 4  Earthquake forecasts and predictions
   Poster presentations
   Final exam
Readings and websites:
Van Rose and Mercer, Volcanoes, Harvard Press
Harris, Agents of Chaos, Mt. Press
http://vulcan.wr.usgs.gov/
http://volcano.und.nodak.edu/vwdocs/msh/ov/ovov/ovov.html
http://www.geophys.washington.edu/SEIS/PSNS/INFO_GENERAL/volcanoes.html
http://quake.wr.usgs.gov/
http://earthquake.usgs.gov/

Steve Carlson, adjunct faculty in the department of geology has taught this course for the last three years. He is committed to teaching it in the future during the summer and during the academic year if opportunity arises. If the course is offered in the academic year, Michael Cummings, Martin Streck, or Georg Grathoff are will to teach it.

3. GENERAL EDUCATION GOALS.
   A. COURSE CONTENT & SUITABILITY FOR CLUSTER
   Discuss the course content in relationship to the thematic focus of the cluster.
   Earthquakes and volcanoes are closely related geologic phenomena that impact human populations and their social organization, modify the landscape, and are among the processes that produce global environmental change. The cumulative impact of these related phenomena in the reorganization of regional-scale geologic features impacts global cycles of the biosphere, hydrosphere, and geosphere. The course fits well with other courses in the Global Environmental Change cluster particularly G399U Geology and History of Hawaii, G399U Earth and Life History of Costa Rica, G455 Minerals in World Affairs, Geog 311 Climatology, and Geog 322 Alpine Environments.

   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**: Field based activities highlight inquiry and critical thinking as students work to gather evidence that establishes the link between geologic process and the products that are produced by the process. Since several processes are involved or the same product may be produced by different processes the task of gathering information, weighing possible interpretations, and drawing conclusions based on the evidence is a solid model of inquiry and critical thinking. The subject material lends itself to inquiry and critical thinking as students evaluate the potential for the seismic and volcanic hazards they face in the Pacific Northwest. When discussions focus on living in a seismically active area, students must evaluate the risk they face and the actions they should take to mitigate the risk.

   2) **Communication**: Challenge questions are used each class period to engage students in discussion of conceptual questions that arise from readings and lecture materials. The instructor builds from student responses to delve into the subject material. Similarly, challenge questions are used in the field to spark student discussions. Written assignments are developed around field investigations and poster presentations centered on topics covered in the course provide a setting for students to develop writing and presentation skills. Through these activities students gain experience evaluating the structure of scientific arguments and how data are used to support hypotheses.
3) **Diversity of Human Experience:** Human experience is deeply rooted in volcanic and earthquake hazards, particularly in the Pacific Northwest. The widespread devastation that accompanies large earthquakes makes all of our experiences common, but how people respond after the disaster and how communities pull together to recover provides some of the most heroic stories of human experience. Likewise, history is filled with tales of bravery and cowardice as people face volcanic hazards. Advice to remain calm and indoors by local authorities as huge volcanic debris flows advance on unsuspecting towns in Colombia lead to 23000 deaths. Following the voice of authority was the worst think people could have done. Who will protect us when nature takes its course?

4) **Ethical Issues & Social Responsibility:** Disasters bring out the best and the worst. Disaster recovery provides a set of issues that tax our understanding of social responsibility and ethics. How rapidly a region can recover from disaster influences its ability to be competitive in a rapidly changing world. If the Columbia River had not been dredged quickly after the eruption of Mount St. Helens, Portland would have ceased to be a port city. Money flowed into the region from across the nation to deal with our problems. Rival port cities may have been advantaged if competition from the Port of Portland had ended. Is it ethical not to help when you may stand to be advantaged.

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 course approach utilizes resources from many perspective including hand-on field-based studies, discussions following presentation by video, group work focused on solving problems related to fundamental concepts, risk assessment, and student presentation. Each teaching strategy it tuned to engage student participation around the conceptual framework of the course.
PROPOSING FACULTY: Michael Brennan

COURSE TITLE AND NUMBER: 6457 Volcanoes + Earthquakes

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

DEPARTMENT CHAIR(S): ________________________________.

DATE: ________________

______________________________.

DATE: ________________

CLUSTER COORDINATOR: ____________________________.

DATE: 12/4/03

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: ________________