Science 2010-11

G 199 Paleobiology and the Fossil Record Course Development

Summary:

This initiative is requesting curriculum development funding for a new course in the Earth and Environmental Science discipline.

Description

This course will expand the offerings of the Earth and Environmental Science discipline to engage the interest of a greater number of non-majors students. The proposed course will not substitute for the G 103 Historical Geology, which can be used for a geology major. Instead, this course will appeal to students with an interest in biology/botany and an interest in collecting and interpreting fossils. The course could possibly be a stepping-stone to engender interest in other aspects of geology.

This course would focus on the history of life on earth. The course would include the following concepts:
a. The paleobiology of ancient organisms, including the varied niches and habitats which have been used by organisms throughout time
b. The mechanisms and processes of evolution, including the different types of evolutionary theory
c. The fossil record of organisms and how that record strengthens evolutionary theory
d. Examination of how the lifestyle of a fossil organism gives clues as to the paleoenvironment in which it lived
e. Sedimentary environments and the types of fossils found in the rocks formed in those environments
f. Plate tectonic theory as a mechanism to explain the distribution of both fossil and modern organisms, and conversely the use of fossil distribution to explain the movement of land masses and the changing of ocean basins through time
g. Evidence for climate change in the past would be examined, including the geologic and biologic causes of the changes and the consequences of paleoclimatic change to ancient living organisms (mass extinction), plus the consequences of climate change for the life of the modern world

This course would provide participating students with a deep understanding of the development of the modern diversity of life on Earth, a recognition of how past climate change has caused major consequences for the life forms which inhabited Earth during those changes, and a greater appreciation of how unique this blue planet Earth is. This appreciation should inspire a push for better stewardship of Earth.

Questions and Answers

How is the initiative linked to the Unit Plans most recently submitted?

1. **How does it continue the achievement of those goals?**
2. **If this is a continuation of an initiative started last year, make sure that relationship is clear.**

How is this initiative linked to the efficiencies and productivities plans you had last year?

1. **How does it continue the achievement of these plans?**
2. **If this is a continuation of an efficiency or productivity plan started last year, make sure that relationship is clear.**

This course would increase the offerings in our discipline, and would be of interest to a larger number of students than the basic Geology sequence courses, potentially increasing enrollment. Examination of past climate change will increase student recognition of the importance of sustainable living practices in their daily lives. The initiative supports these themes and goals in our recent Unit Plan:
Themes:

1. optimizing sustainable access for students and options for quality learning
2. optimizing the curricula and resources we already have

Goals:
#3) Increase sustainability-related curricula in support of sustainability in learning goals.
#7) Additional curricular activities to improve student success and more options for completing AAOT and other program requirements.

The themes and goals from the Unit Plan for FY10 are carried through into the FY11 plan. This is a course that can be taught by any of the instructors who now teach Geology 103. This increases our efficiency in that having only one instructor able to teach a course would make it more difficult to offer the course. Geology 103 focuses on tectonics and the fossil record. The curriculum does not use the full breadth of fossil specimens which the EES discipline has available to it. This course would make greater usage of those specimens on hand and will allow us to expand our already excellent collection. An increase in productivity and efficiency is a continuance of goals from the FY10 unit plan.

Describe the resources needed:

100 hours of curriculum development funds are needed to develop this new course.

The EES stockroom has a considerable collection of marine invertebrate fossils from recent formations in Oregon, and a variety of specimens of varying age and provenance in the collections. A moderate number of purchases would need to be made to round out the marine invertebrate part of the collection. A larger number of purchases would need to be made of plant

fossils, as the present collections are minimal. A select number of vertebrate fossils/models would also need to be purchased. Specimens of sedimentary structures are used for the analysis of possible sedimentary environments of the past. EES does have some of these structures in the collections, but having more than one of each type would be desirable. EES discipline funds would be used to purchase these additional specimens.

What specific measurable program outcomes do you expect to achieve with this initiative? The outcomes should be specific enough to be measurable. Also, outline the method that will be used to determine the results.

Non-majors are currently limited to G101, G102 and G103 as options for Geology courses. The proposed course will afford another option, which may attract life science students as well. An informal survey of geology students in current courses has yielded positive feedback about interest in a course of this type. We anticipate an increase in numbers of students taking two or more EES courses. The curriculum will also incorporate sustainability learning outcomes. Specific outcomes are:

1. increase in number of students taking two or more EES courses (survey data).
2. increased options for student success.
3. increased FTE in the EES discipline (IRAP data).
4. students gaining knowledge of sustainability learning outcomes (assessment of SLOs).

Department Priority:

9

Unit Resources:

Priority ranking for this initiative was determined by SAC members drawing numbers randomly. All the initiatives are valuable to the proposing disciplines and all have the support of the Division.

The following resources will be devoted to this project: faculty work time not offset by curriculum development hours to develop outcomes, topics, course materials; equipment; classrooms; extensive use of EES fossil specimens; support for field trips; and support from the Science Resource Center (SRC). More than one EES faculty member can teach the course.

Funding Request: Carl Perkins

Funding Request: Curriculum Development

1. List the following information

- **Course Numbers (titles if not currently offered)**
- **Instructor Name(s) who will work on the curriculum development**

- **Whether each of the courses is in, or has been through, the curriculum approval process**

G 199: Paleobiology and the Fossil Record
Mary Baxter will be the lead instructor working on course development, with approximately 5 hours each for collaboration with other faculty members who now teach G103 in the rotation: Andrea Rice, Greg Miles and Dave Blackwell. Mary has taught a course at the University of Oregon which is titled "The Fossil Record."
This course has not been through the curriculum approval process.

2. List each course number (or title) and the materials to be created for each class

- **Instructional goals, objectives, syllabi and outlines**
- **Lab instruction packets**
- **Practice, quiz, presentation &/or demonstration materials**
- **Other (specify)**

G 199: Paleobiology and the Fossil Record
Course materials will include instructional goals, learning objectives, syllabi and outlines; a course packet which includes laboratory projects, vocabulary sheets, geologic time scale exercise, and other materials to guide and supplement class activities; activities focused on sustainability objectives; exams, quizzes, and other assessments of student learning outcomes; presentation and/or demonstration materials; and updated and expanded fossil specimen lists. We will also complete the Division stakeholder process and the curriculum approval process for the new course, including identifying an appropriate course number.

3. List each course number (or title) and give your timeline for beginning and completing each course curriculum development.

G 199: Paleobiology and the Fossil Record
Course development would begin once funding is established, and most of the work will occur during the summer 2010. The course development will be finished by end of Fall term 2010.

4. What are up to 3 departmental instructional goals that are met through the development of curriculum in each class?

G 199: Paleobiology and the Fossil Record
This initiative meets these instructional goals for the Science Division:

1. optimizing sustainable access for students and options for quality learning
2. optimizing the curricula and resources we already have
3. Increase sustainability-related curricula in support of sustainability in learning goals.
4. improve student success and provide more options for completing AAOT and other program requirements.

5. List each course number (or title) and give the value of the development of curriculum in each course to other faculty members.

G 199: Paleobiology and the Fossil Record
Developing this course will benefit other EES and Biology faculty by updating and expanding our fossil collection and developing learning activities with an emphasis on evolution and paleoclimates. These activities could be incorporated into a variety of ecology and environmental science courses in the Division.

6. List each course number (or title) and say how many students will be served by the development of curriculum in each class.

G 199: Paleobiology and the Fossil Record
A lecture/lab course held in the classroom would accommodate 24 students a term. The course is likely to be offered once or twice in an academic year; and could be a summer term offering.

7. List each course number (or title) and give the specific benefits to students that you expect from the development of curriculum in each class.

G 199: Paleobiology and the Fossil Record
The development of this course would increase the variety of courses offered by the EES discipline. Non-science major students with an interest in geology and/or biology would have another science course offering, which could be used to fulfill their AAOT science requirements. This course would provide participating students with a deep understanding of the development of the modern diversity of life on Earth, recognition of how past climate change has had major consequences for the life forms that inhabited Earth during those changes, and a greater appreciation of how unique our planet is.

8. List each course number (or title) and give the specific benefits for diversity that you expect from the development of curriculum in each class.

G 199: Paleobiology and the Fossil Record
This course will increase student knowledge of the diversity of life on earth in the past, leading to an appreciation of the diversity of modern life. It will foster a worldview for the students by examining the fossil record from the entire world, not just from within certain political boundaries. Every opportunity is taken to include the work done by scientists of both genders and many ethnicities.

9. List each course number (or title) and give the specific benefits to sustainability that you expect from the development of curriculum in each class.

G 199: Paleobiology and the Fossil Record
The course will incorporate sustainability learning outcomes. By learning of examples of past climate change, students will be able to see the probable effects of current climate change on the living organisms of Earth. Examination of the development of coal and petroleum resources in

the rock record by the sequestration of the carbon of once-living organisms, will lead to a better understanding of the apparent unsustainability of our modern reliance on those resources.

10. List each course number (or title) and give the specific effects on distributed learning that you expect from the development of curriculum in each class.

G 199: Paleobiology and the Fossil Record
Current plans to not include developing an online version of this course because the course makes extensive use of actual fossil specimens in the laboratory and includes fieldtrips.

Hours requested for Curriculum Development funding:

Please enter the amount of one of the following:

- **100 hours maximum for new development.**
- **70 hours maximum for course revision**
- **50 hours for 3-4 credit conversion**
- **other (use if multiple courses addressed in one initiative**

Do not enter any characters other than numbers and a decimal.

How many hours are you requesting? If there are multiple courses addressed in the initiative, please list each course number (or title) and give the number of hours requested for each course.

100

Can this initiative be partially funded?

Yes

Partially funded curriculum development HOURS requested:

70

Explanation of effect of partial funding:

The course will be developed by part-time faculty. Reducing hours will limit collaboration among the EES faculty and reduce the number of learning activities which can be developed to support the curriculum.

Funding Request: Technology Fee