

WINONA STATE UNIVERSITY
GENERAL EDUCATION PROGRAM APPROVAL FORM

Routing form for General Education Program Course approval.

Course GEOS 114 Catastrophes and Extinctions with Laboratory

Department Approval		
<u>[Signature]</u> Department Chair	<u>1/23/14</u> Date	<u>tdogwiler</u> e-mail address
Dean's Recommendation <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No*		
<u>Charles Smitsch</u> Dean of College	<u>1/28/14</u> Date	
*If the dean does not approve the proposal, a written rationale should be provided to the General Education Program Subcommittee.		
GEPS Recommendation <input type="checkbox"/> Approved <input type="checkbox"/> Disapproved		
Chair, General Education Program Subcommittee		Date
A2C2 Recommendation <input type="checkbox"/> Approved <input type="checkbox"/> Disapproved		
Chair of A2C2		Date
Faculty Senate Recommendation <input type="checkbox"/> Approved <input type="checkbox"/> Disapproved		
President of Faculty Senate		Date
Academic Vice President Recommendation <input type="checkbox"/> Approved <input type="checkbox"/> Disapproved		
Academic Vice President		Date
Decision of President <input type="checkbox"/> Approved <input type="checkbox"/> Disapproved		
President		Date
Please forward to Registrar.		
Registrar	Date entered	Please notify department chair via e-mail that curricular change has been recorded.

[Revised 10-22-12]

5/21/14

WINONA STATE UNIVERSITY
PROPOSAL FOR GENERAL EDUCATION PROGRAM COURSES

Department Geoscience

Date 1/22/2014

114

Course No.

Catastrophes and Extinctions with Laboratory

Course Name

4

Credits

Prerequisites none

GEP Goal Area(s):*

CORE GOAL AREAS

- ☐ Goal 1: Communication
☒ Goal 3: Natural Science
☐ Goal 4: Mathematics/Logical Reasoning
☐ Goal 5: History and the Social and Behavioral Sciences
☐ Goal 6: The Humanities and Fine Arts

THEME GOAL AREAS

- ☐ Goal 7: Human Diversity
☐ Goal 8: Global Perspective
☐ Goal 9: Ethical and Civic Responsibility
☐ Goal 10: People and the Environment

* Courses may be submitted for up to two Goal Areas.

Additional Requirement Categories (list number of credits desired in appropriate category):

☐ Intensive:

- ☐ 1. Writing
☐ 2. Oral Communication
☐ 3a. Mathematics/Statistics
☐ 3b. Critical Analysis

☐ Physical Development and Wellness

Provide information as specified in the previous directions.

Attach a **General Education Program Approval Form**.

Department Contact Person for this Proposal:

W. Lee Beatty

Name (please print)

x2241

Phone

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e-mail address

[Revised 9-6-11]

Outline:

1. Rocks and the rock cycle
 - a. Sedimentary rocks
 - b. Igneous rocks
 - c. Metamorphic rocks
 - d. The rock cycle
2. Geologic Time
 - a. Relative dating
 - b. Radiometric dating
 - c. The geologic timescale
3. Formation/early history of the Earth
 - a. Formation of the Solar System
 - b. Formation of the Earth
 - c. Iron catastrophe
 - d. Formation of the Moon
 - e. Heavy bombardment
4. Plate tectonics
 - a. Layers of the Earth
 - b. Convergent boundaries
 - c. Divergent boundaries
 - d. Transform boundaries
 - e. Hot spot volcanism
 - f. What moves the plates?
5. The atmosphere
 - a. Composition
 - b. Climate controls
 - c. Albedo
 - d. Greenhouse effect
 - e. Feedbacks
 - f. The carbon cycle
6. Early life
 - a. Tree of life
 - b. Prokaryotes
 - c. Eukaryotes
 - d. Extremophiles
 - e. Stromatolites
 - f. Photosynthesis
7. Rise of oxygen
 - a. Causes & evidence
 - b. Banded iron formations
 - c. Paleosols
 - d. Redbeds
 - e. Oxygen holocaust
8. Glaciers & Snowball Earth
 - a. Properties and processes of modern glaciers
 - b. Milankovitch cycles
 - c. Evidence for global glaciations
 - d. End-proterozoic snowball Earth
 - e. Emerging from snowball Earth
 - f. Effects on biodiversity
9. Fossils and the fossil record
 - a. What is a fossil?
 - b. Methods of preservation
10. Evolution and Extinction
 - a. What is evolution?
 - b. Genetic mutation
 - c. Natural selection
 - d. What is extinction?
 - e. Background extinction
 - f. Mass extinction
 - g. The fossil record of extinction
11. The Paleozoic
 - a. Cambrian explosion
 - b. Ordovician extinction
 - c. Devonian extinction
 - d. Permian extinction
12. The Mesozoic
 - a. Triassic extinction
 - b. Cretaceous extinction
13. The Cenozoic
 - a. Megafauna extinction
 - b. Toba catastrophe
 - c. European-influenced extinction
 - d. Present-day extinctions

Student Competencies for GEP Goal 3	Learning Opportunity	Assessment Method
Demonstrate understanding of scientific theories	Students will have multiple opportunities to investigate scientific theories and processes pertinent to the study of geoscience, global catastrophes and mass extinctions.	In laboratory exercises and in-class assignments , students will investigate (over multiple weeks) how one of the fundamental theories of the geosciences, plate tectonics, was one of the mechanisms that led to several mass extinctions during Earth's history. Students will demonstrate their knowledge of these theories on quizzes and exams .
Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students, laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty	Students will have a variety of opportunities to collect and analyze their own data, analyze existing data sets, and graph and interpret data in order to answer questions pertinent to the study of geology, global catastrophes and mass extinctions.	Most laboratory exercises will involve some level of data collection, mathematical and graphical manipulation of data and interpretation (for example, evaluating damage caused by meteor impacts, charting changes in fossil populations, mapping the global effects of volcanic eruptions, etc.). In classroom discussions, quizzes and exams students will be asked to interpret graphical presentations of data in order to answer questions.
Communicate their experimental findings, analyses, and interpretations both orally and in writing.	Students will work collaboratively during laboratory sessions, reason out their findings with their partners, and present written lab assignments.	Students will be assessed through laboratory exercises .
Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies	Students will have multiple opportunities to explore the ways our society interacts with the Earth system, and to evaluate implications of these interactions.	In laboratory exercises, in-class assignments, quizzes and exams students will be asked to evaluate humanity's impact on the Earth system, particularly the climate system and the biosphere. They will also evaluate human-induced extinctions, both historical and modern, and how (or if) humans can prevent another mass extinction event.