WINONA STATE UNIVERSITY
PROPOSAL FOR NEW COURSES

Department _____GEOSCIENCE__________________________ Date _____SEPTEMBER 28, 2003_____ 

104 ______________ CATASTROPHES & EXTINCTIONS __________ Credits 3 ________ 

Course No. Course Name 
This proposal is for a(n) __XX__ Undergraduate Course ______ Graduate Course 
Applies to: __XX__ Major __XX__ Minor __XX__ University Studies* 

_XX_ Required _XX_ Elective _XX_ Required _XX_ Elective 

Prerequisites __NONE__ 

Grading method __XX__ Grade only ______ P/NC only ______ Grade and P/NC Option 
Frequency of offering __ALTERNATE YEARS__ 

*For University Studies Program course approval, the form Proposal for University Studies Courses must also be completed. submitted according to the instructions on that form. 

Provide the following information (attach materials to this proposal): 

A. Course Description 
   1. Catalog description. 
   2. Course outline of the major topics and subtopics (minimum of two-level outline). 
   3. Basic instructional plan and methods. 
   4. Course requirements (papers, lab work, projects, etc.) and means of evaluation. 
   5. Course materials (textbook(s), articles, etc.). 
   6. List of references. 

B. Rationale 
   1. Statement of the major focus and objectives of the course. 
   2. Specify how this new course contributes to the departmental curriculum. 
   3. Indicate any course(s) which may be dropped if this course is approved. 

C. Impact of this Course on other Departments, Programs, Majors, or Minors 
   1. Does this course increase or decrease the total credits required by a major or minor of any other department? If so, which department(s)? 
   2. List the departments, if any, which have been consulted about this proposal. 

D. University Studies Course Proposals 
   The form Proposal for University Studies Course must also be completed and submitted according to the instructions on that form. 

Attach a Financial and Staffing Data Sheet. 

Attach an Approval Form. 

Department Contact Person for this Proposal: 

CATHY SUMMA _____457-5269____ csumma@winona.edu 
Name (please print) Phone e-mail address
Include a Financial and Staffing Data Sheet with any proposal for a new course, new program, or revised program.

Please answer the following questions completely. Provide supporting data.

1. Would this course or program be taught with existing staff or with new or additional staff? If this course would be taught by adjunct faculty, include a rationale.

   This course will be taught by existing staff.

2. What impact would approval of this course/program have on current course offerings? Please discuss number of sections of current offerings, dropping of courses, etc.

   Offering this course will require that the Geoscience Department offer fewer sections of other existing courses. Our plan is to alternate this course with other introductory courses in our curriculum to provide students greater choice in general-education options and to accommodate faculty teaching interests. We would offer only one section of this course in any given semester.

   To accommodate offering this course, we will no longer offer GEOS 230 – Paleontology. The content of paleontology will be partially incorporated into this course. This course will be offered in its place on an alternate year basis.

3. What effect would approval of this course/program have on the department supplies? Include data to support expenditures for staffing, equipment, supplies, instructional resources, etc.

   This course would make use of existing supplies. We have a fairly extensive paleontology collection that will be available for use in this course, particularly because the paleontology course will no longer be offered (see #2 above). If the instructor chooses to include a field trip in this course, students will be charged a course fee to cover trip expenses (as is done with existing courses that include field experiences).
WINONA STATE UNIVERSITY
APPROVAL FORM

Routing form for new and revised courses and programs.
Course or Program: GEOS 104

<table>
<thead>
<tr>
<th>Department Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department Chair</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dean’s Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved</td>
</tr>
<tr>
<td>Dean of College</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A2C2 Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved</td>
</tr>
<tr>
<td>For: Major</td>
</tr>
<tr>
<td>Chair of A2C2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graduate Council Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved</td>
</tr>
<tr>
<td>Chair of Graduate Council</td>
</tr>
<tr>
<td>Director of Graduate Studies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Faculty Senate Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved</td>
</tr>
<tr>
<td>President of Faculty Senate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Academic Vice President Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved</td>
</tr>
<tr>
<td>Academic Vice President</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Decision of President</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved</td>
</tr>
<tr>
<td>President</td>
</tr>
</tbody>
</table>

Please forward to Registrar.
Registrar | Date entered
Please notify department chair via e-mail that curricular change has been recorded.
A. 1. Course Description: GEOS 104 – Catastrophes and Extinctions (3 s.h.) – Over 99% of the animal species that once inhabited the Earth are now extinct. Remarkably, most of these extinctions have been associated through time with significant geologic events that are considered by many to be catastrophic. In this course, students will explore the major extinctions that have taken place through geologic history. These include the extinction of numerous marine invertebrate species, the extinction of the dinosaurs 65 million years ago, the extinction of large mammals during the last ice age, and many others. Weekend (overnight) field trip required. Offered alternate years. Lecture only. No prerequisites.

A. 2. Course syllabus:

Catastrophes & Extinctions

A. The Geologic Time Scale
   Relative Time
   Absolute Time
   Age of the Earth
   a. Radiometric Dating

B. Geologic Boundaries and the Events that Define them
   1. Precambrian events
      Stromatolite evolution and decline (extinction)
      Achritarch evolution and extinction
      Evolution of Earth’s atmosphere
      The Role of Banded Iron Formations
      Ediacaran faunal evolution and extinction
   2. Precambrian-Cambrian boundary events
      Snowball Earth
      Evolution of modern phyla
   3. Paleozoic events
      Cambrian Glaciation
      Ordovician Glaciation
      Devonian Impact (?)
      Pennsylvanian/Permian events
      Assembly of Pangaea
      Permian Mass extinction
   4. Mesozoic Events
      Rise of reptiles
      Global Paleoclimate changes
      Breakup of Pangaea
      Oxygen fluctuations
      Dinosaur Extinction
      Impact?
   4. Cenozoic Events
      Rise of mammals

   Global Paleoclimate changes
   Uplift and growth of Himalayas
   Pleistocene Glaciation
   Evolution of Humans
   Human Extinctions
   Extinction of large mammals

5. Human Impact on Extinction
   a. How humans alter their environment
   b. Modern (Holocene) Extinction events – natural or human induced?
      Passenger Pigeon
      Condor
      Etc.

6. Can/Should we predict the Extinctions of the future (and guard against them?)

7. Rates of extinction through time
   a. Gradualism vs. catastrophism
   b. What defines a catastrophe?
   c. What defines a mass extinction?

8. Causes of Mass Extinction
   a. Internal Processes
      i. Sea-level change
      ii. Climate change
      iii. Volcanism
   b. External Processes
      i. Impact
      ii. Orbital Variation
      iii. Other Astronomical Phenomena
         (supernova explosions, gamma ray burst, etc.)
A. 3. Basic Instructional Plan

This course will be scheduled to meet 3 times weekly for 1-hour lecture periods. In addition, students will have the opportunity to participate in a field trip to a geologic site related to course material. Potential field sites include a weekend (long-weekend) trip to the Badlands or the Mammoth site in the Black Hills. Either of these sites will enable the class to view first-hand the results of catastrophic kill events, as these sites represent unique fossil localities.

A primary goal of this course is to engage the non-science student in scientific thought. We seek to motivate students by studying a topic of general interest from a scientific perspective. Additionally we hope to build student confidence in their ability to ask pertinent scientific questions and to develop appropriate tools to answer those questions. We chose extinctions and their causes as the theme for this course because many students have previously heard something about the demise of species, particularly the dinosaurs.

Although primarily a lecture course, students will have ample opportunity to work with fossil specimens in the context of class assignments as we try to bring the field (laboratory) into the classroom. The department has an extensive fossil collection that will serve as the basis for helping students understand the form and variety of extinct organisms.

This course will take a historical perspective, looking at major evolutionary events through geologic time, as a way for students to develop some context for understanding human impact on their modern environment. Ultimately, we wish to engage students in a critical discussion about how humans have modified the world and the impact of human endeavors on the global society (including lives of other species).

A. 4. Course Requirements

Students will be required to attend class regularly, complete all assignments, and develop a capstone investigation. In addition to readings from the text, students will read popular literature and explore websites relevant to course content. Exams and quizzes will provide one part of the evaluation scheme. The completion of a final poster will constitute a significant portion of the class grade. Class participation will be a factor in calculation of final grades.

A. 5. Course Materials


Other Required Materials:
Laptop; Brain

A. 6. Bibliography


Knoll, A., 2003, Life on a Young Earth: Harvard University Press, Cambridge, MA,


B. Rationale

1. Statement of the major focus and objective of the course.

The major focus of this course is to introduce non-science majors to the variety of factors controlling the evolution and extinction of species throughout geologic time. In all introductory-level Geoscience courses, department faculty seek to build critical thinking skills, and to instill in students the confidence to solve scientific problems and to ask scientifically viable questions. We try to build on students previous experience and knowledge, and to draw connections between geologic processes and their everyday lives and experience. This course plays off the general interest in the life and death of dinosaurs and other species.

2. Specify how this new course contributes to the departmental curriculum.

This course (Catastrophes and Extinctions) contributes to the Geoscience curriculum by helping us achieve our goal of establishing a broad range of introductory courses available for the general non-science student. We have traditionally offered some of the content of this course in our upper-division Paleontology course. The Paleontology course has seen decreasing enrollments over the past several years, and represents a dying field in geoscience. Ironically, just as this subdiscipline is fading in importance in the discipline, it’s popularity is growing among the general population, as witnessed by the number of popular titles available on these topics. Students of all ages are extremely interested in dinosaurs, and the extinction of species. We believe it important to respond to changing times and student interests, and thus, propose this course for the WSU curriculum.

3. Indicate any course(s) that may be dropped if this course is approved.

If this course (Catastrophes and Extinctions) is approved, the Geoscience Department intends to drop our existing course, GEOS 230, Paleontology.

C. Impact on Other Departments, Programs, Majors and Minors

C. 1. This course does not directly impact any other department or program. It is designed specifically as a course for University Studies credit, for the general education student, rather than for science majors or minors. Because it is designed and offered as a University Studies Course (proposal to follow CPPS approval), it is not a requirement in any program, major, or minor on campus.

C. 2. Because this course effectively replaces an upper-division course in our curriculum that is not required by any program but our own, and will otherwise be available for the University Studies program, the Geoscience Department did not consult with other departments prior to submitting this proposal. We felt the A2C2 process would provide adequate notification.

D. University Studies

If approved by the CPPS, this course will be submitted for approval in the University Studies program as a course satisfying the Arts & Science Core: Natural Science requirements. This course will not be offered if not also approved for credit in the University Studies program.