WINONA STATE UNIVERSITY
PROPOSAL FOR NEW COURSES

Department ___________ GEOSCIENCE ___________ Date _______ 29 September 2003____

Course No. _______ 415 _______ Course Name ADVANCED GEOMORPHOLOGY _______ Credits _______ 4 _______

This proposal is for a(n) _______ Undergraduate Course _______ Graduate Course

Applies to: _______ XX__ Major _______ XX__ Minor _______ XX__ University Studies*

Prerequisites _______ GEOS 240 OR PERMISSION OF THE INSTRUCTOR

Grading method _______ XX__ Grade only _______ P/NC only _______ Grade and P/NC Option

Frequency of offering _______ ALTERNATE YEAR (FALL) _______

*For University Studies Program course approval, the form Proposal for University Studies Courses must also be completed.

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:

______ Toby Dogwiler ___________________________ x5267 _______ tdogwiler@winona.edu ______
Name (please print) Phone e-mail address

Geoscience 415 1 T. Dogwiler
Advanced Geomorphology Course Proposal
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.

   Geoscience 415, Advanced Geomorphology, 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.

   This course is being revised to mesh with other recently approved changes to the Geoscience curriculum. Specifically, material that was formerly taught in GEOS 315 Surficial Processes and Soils, has been incorporated into GEOS 240 Watershed Science (which will be a pre-requisite for the GEOS 415). Thus, this course will replace GEOS 315 and expand on the concepts formerly taught in that course. This will result in the proposed course, GEOS 415, encompassing sufficiently advanced and challenging concepts, along with expectations for student effort and achievement, to justify the 400-level status.

   This course will replace GEOS 315 Surficial Processes and Soils (effective Fall 2005) and will be taught on the same schedule GEOS 315 was formerly offered. It will not affect other current course offerings.

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.

   The Geoscience Department has purchased the equipment required for this course during the previous two academic years. Thus, no additional funds will be necessary to begin this course.
Routing form for new and revised courses and programs.  

| Course or Program          | Geoscience 415 Advanced Geomorphology |

**Department Recommendation**

| Department Chair | Date | e-mail address |

**Dean’s Recommendation**  
- Approved  
- Disapproved

| Dean of College | Date |

**A2C2 Recommendation**  
- Approved  
- Disapproved  
  
For:  
- Major  
- Minor

| Chair of A2C2 | Date |

**Graduate Council Recommendation**

- Approved  
- Disapproved

| Chair of Graduate Council | Date |

| Director of Graduate Studies | Date |

**Faculty Senate Recommendation**  
- Approved  
- Disapproved

| President of Faculty Senate | Date |

**Academic Vice President Recommendation**  
- Approved  
- Disapproved

| Academic Vice President | Date |

**Decision of President**  
- Approved  
- Disapproved

| President | Date |

Please forward to Registrar.

| Registrar | Date entered |

Please notify department chair via e-mail that curricular change has been recorded.
A. Provide a Description of the Course

GEOS 415 Advanced Geomorphology

T/Th 12:30 – 1:50 (Lecture)
T 2:00-5:50 (Lab)
Room 116 PA

Instructor: Dr. Toby Dogwiler, PA 114A, 457-5267, tdogwiler@winona.edu

Course Catalog Description:

415 – Advanced Geomorphology —4 S.H.
Study of the landscapes and the processes that shape the Earth’s surface and shallow subsurface. The role of climate, tectonics, bedrock geology, and time as controls on geomorphic processes are explored. An emphasis is placed on developing a quantitative understanding of the mechanisms of landscape processes through indoor and outdoor laboratory exercises and field trips. Prerequisites: GEOS 240 or permission of the instructor.

Course Philosophy

Geomorphology by its nature is an interdisciplinary science. This course integrates climatology, meteorology, plate tectonics, stratigraphy and bedrock geology, and Earth History toward an understanding of the geomorphic processes that have shaped the Earth’s surface during the Cenozoic era. Laboratory assignments are hands-on and involve both topographic map and aerial photo analysis as well as field-based exercises and excursions. A strong emphasis is placed on quantifying geomorphic processes, particularly using Geographic Information Systems (GIS).

Course Objectives

Course objectives will be achieved via a scholarly review of the literature, lectures, discussions, and laboratory exercises.

- Define geomorphology and its scope and relationship to other fields
- Understand the relationship between:
  - Landscapes and tectonic processes.
  - Landscapes and climate change
  - Landscapes and stratigraphy, structure, and bedrock geology
- Understand energy flow in geomorphic systems
- Investigate how Earth’s landscapes have evolved through the Cenozoic
- Investigate the processes of that have shaped Earth’s landscapes
- Explore the various types and categories of landforms and how they are interpreted with respect to formational processes

Literature

Required texts:
Reference List:

Instructional Plan
We will meet twice each week for 1.5 hour periods in addition to a 4 hour laboratory period. Lecture and laboratory times will be integrated and the distinction between them will be “fuzzy”. This will allow the course material, topics, and student/faculty interests to dictate the flow of the course—rather than arbitrary distinctions between “lecture time” and “laboratory time”.

Assessment
Exams
Mid-Term Exam 20%
Final Exam 20%
Literature Discussions
Each student will lead two discussions of works from the primary literature. Students will choose appropriate articles in consultation with the instructor. The discussion leader will be responsible for providing a brief (5 minute) discussion to the class of other background literature that has a bearing on the featured articles. The leader will then be responsible for facilitating a discussion 10-15 minute class discussion of the article. The leader should be prepared to pose challenging questions to the class to help stimulate discourse. At least one day prior to the discussion, the discussion leader will turn a summary analysis of the key components of the article as describe in section 1 (i-v) of the Critical Analysis Flag learning outcomes outlined below. 20%
Laboratory Exercises
Laboratory Exercises, Assignments, Field Trips (incl. assignments, reports, student presentations, required field trips) 40%
Total 100%
Course Outline:
The following outline is tentative and will likely be modified over the course of the semester. Generally, the lecture sequence will follow the textbook sequence.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Reading Assignment</th>
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<tbody>
<tr>
<td>a) The scope of geomorphology</td>
<td>i) Scales of landscape analysis</td>
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<td>ii) The Landform as the Unit of Systematic Analysis</td>
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<td>b) Energy flow in geomorphic systems</td>
<td>i) The systems concept in geomorphology</td>
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<td>ii) Solar Radiation</td>
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<td>iii) Rotational Energy</td>
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<td>iv) Internal Heat</td>
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<td>c) Cenozoic Tectonism and Climate Change</td>
<td>i) Plate motions, continental relief</td>
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<td>ii) Climate</td>
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<td>(1) Oceanic Circulation</td>
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<td>(2) CO₂ variability</td>
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<td>d) Rock Weathering and Soil Formation</td>
<td>i) Mechanical processes</td>
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<td>ii) Chemical processes</td>
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<td>iii) Biologic processes</td>
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<td>iv) Pedology (soil formation)</td>
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<td>e) Mass Wasting and Hillslopes</td>
<td>i) Descriptive classifications</td>
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<td>ii) Hillslope development and evolution</td>
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<td>f) Fluvial Processes</td>
<td>i) Overland flow</td>
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<td>ii) Channeled flow</td>
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<td>iii) Overbank flow</td>
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<td>iv) Erosion and transport</td>
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<td>v) Drainage basin evolution</td>
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<td>g) Eolian Processes and Landforms</td>
<td>i) Landforms of dry regions</td>
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<td>ii) Tropical savannas</td>
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<td>h) Landscape Evolution</td>
<td>i) Dedictive geomorphology</td>
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<td>ii) Rates of landscape evolution</td>
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<td>i) Periglacial and Glacial Geomorphology</td>
<td>i) Processes</td>
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<td>(1) Glaciation</td>
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<td>ii) Landforms</td>
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<td>(a) Continental</td>
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<td>(b) Alpine</td>
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<td>(3) Depositional</td>
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<td>(a) Continental</td>
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<td>(b) Alpine</td>
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<td>j) Coastal Geomorphology</td>
<td>i) Shore-zone processes</td>
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</table>
ii) Shore-zone landforms

Each lettered topic will also be explored via a laboratory exercise.
B. Rationale for the New Course

**Major Focus and Course Objectives**
Course objectives will be achieved via a scholarly review of the literature, lectures, discussions, and laboratory exercises.

- Define geomorphology and its scope and relationship to other fields
- Understand the relationship between:
  - Landscapes and tectonic processes.
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**How the Course Will Contribute to the Geoscience Department Curriculum**
As part of the curriculum revision in the Geoscience curriculum this course will provide students with an opportunity to develop an understanding of how the Earth is shaped by constructional and destructional processes. This course will replace GEOS 315 and expand on the concepts taught in that course by emphasizing a Earth System Science approach and increasing the focus on the role of tectonic and climatologic process on shaping the landscape.

**Courses which may be dropped**
Surficial Processes and Soils (GEOS 315) will be dropped from the Geoscience curriculum.

C. Provide a Statement of the Impact of this Course on Other Departments….

**Clearly State the Impact of this Course on Course Taught in Other Departments**
No impact on courses taught in other departments is anticipated. This course does not duplicate the content of courses taught in other departments. There is no anticipated effect on prerequisites.

This course will provide be required for the Geoscience: Environmental Science option majors and serve as an additional elective for Geoscience majors in other options. Also, if approved by the Environmental Science Steering Committee it could potentially serve as an additional option in the pool of electives for Environmental Science majors from the Biology and Chemistry departments. This could be a particularly attractive elective to Biology majors interested stream ecology and aquatic biology because of the relevance of the material, particularly fluvial processes.

**Would Approval of this Course Change the Total Number of Credits Required by any Major…**
Approval of Advanced Geomorphology would not change the number of credits required for any major or minor.

**Impact on the Major or Minor of Another Department**
Approval of Advanced Geomorphology would have no impact on Majors or Minors in other departments.

D. University Studies Program
Advanced Geomorphology will be submitted for consideration as a critical analysis flag course.